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Transactions of the Indiana Horticultural Society

Indiana Horticultural Society

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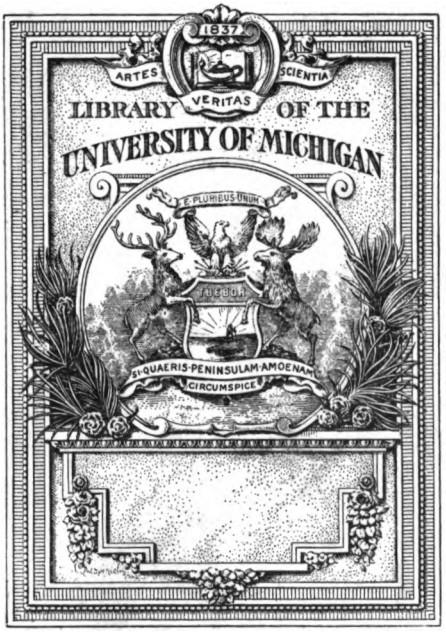

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TRANSACTIONS

OF THE

Indiana Horticultural Society

FOR THE YEAR 1907

BEING A

REPORT OF THE FORTY-SEVENTH ANNUAL MEETING, HELD IN ROOM 12, STATE HOUSE, INDIANAPOLIS, IND., DECEMBER 4 AND 5, 1907, TOGETHER WITH REPORT OF THE SUMMER MEETING, HELD IN LAFAYETTE, AUGUST 7 AND 8— PROCEEDINGS OF THE STATE BOARD OF HORTICULTURE, LOCAL SOCIETIES, SELECTED PAPERS, ETC.

BY W. B. FLICK, SECRETARY

TO THE GOVERNOR

INDIANAPOLIS:
WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING
1908

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THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
INDIANAPOLIS, March 16, 1908.

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

OFFICE OF AUDITOR OF STATE,
INDIANAPOLIS, March 23, 1908.

The within report, so far as the same relates to moneys drawn from the State Treasury, has been examined and found correct.

J. O. BILLHEIMER,
Auditor of State.

March 23, 1908.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

FRED L. GEMMER,
Secretary to the Governor.

Filed in the office of the Secretary of State of the State of Indiana, March 23, 1908.

FRED A. SIMS,
Secretary of State.

Received the within report and delivered to the printer March 23, 1908.

HARRY SLOUGH,
Clerk Printing Bureau.

194019

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LETTER OF TRANSMITTAL.

To His Excellency, Hon. J. Frank Hanly, Governor of Indiana:

Sir—In accordance with the requirements of law, I have the honor to herewith present you with the forty-seventh annual volume of transactions of the Indiana Horticultural Society, together with such other papers as seem to be appropriate for publication in this connection.

Respectfully,

W. B. FLICK,

February 25, 1908. Secretary.

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OFFICERS OF THE SOCIETY AND MEMBERS STATE BOARD OF HORTICULTURE FOR 1907-1908.

President	W. C. Reed	Vincennes.
Vice-President	L. B. Custer	Logansport.
Secretary	W. B. Flick	Lawrence.
Treasurer	Samuel A. Hazelett	Greencastle.

Members of Committee on Horticulture.

First District	W. J. Ritterskamp	Princeton.
Second District	R. A. Simpson	Vincennes.
Third District	Chas. N. Lindley	Salem.
Fourth District	Elmer G. Tufts*	Aurora.
Fifth District	James W. Carver	Greencastle.
Sixth District	J. F. Coffin	Greenfield.
Seventh District	J. J. Milhous	Valley Mills.
Eighth District	A. W. Shoemaker	Daleville.
Ninth District	J. N. Snodgrass	Kirklin.
Tenth District	H. W. Henry	Laporte.
Eleventh District	E. R. Gustin	Peru.
Twelfth District	J. C. Grossman†	Wolcottville.
Thirteenth District	F. A. Forbes	Plymouth.

Executive Committee.

Prof. James Troop, Lafayette.
Term expires 1909.

Walter S. Ratliff, Richmond.
Term expires 1908.

E. Y. Teas, Centerville.
Term expires 1910.

Committee of Control of Experimental Orchard.

Joe A. Burton, Orleans, Superintendent Experimental Orchard; C. M. Hobbs, Prof. Troop and J. V. Simpson.

*Deceased.
†Resigned.

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OFFICERS OF THE INDIANA HORTICULTURAL SOCIETY SINCE ITS ORGANIZATION IN 1860.

Date.	President.	First Vice-President.	Secretary.	Treasurer.
1860	*Reuben Ragan	William Miller	Wm. H. Loomis	John C. Teas.
1861-2	*John A. Matson	*William Miller	*Wm. H. Loomis	John C. Teas.
1863	I. D. G. Nelson	Joseph Orr	Geo. M. Beeler	John C. Teas.
1864	I. D. G. Nelson	Joseph Orr	Geo. M. Beeler	John C. Teas.
1865	I. D. G. Nelson	Joseph Orr	Geo. M. Beeler	Clavin Fletcher.
1866	I. D. G. Nelson	*Joseph Orr	*Geo. M. Beeler	Calvin Fletcher.
1967	I. D. G. Nelson	Allen Furnas	†Samuel V. Morris Seth W. Pearson ‡Joseph Gilbert	J. S. Dunlop.
1868	I. D. G. Nelson	*Allen Furnas	Seth W. Pearson ‡Joseph Gilbert	*J. S. Dunlop.
1869	*I. D. G. Nelson	S. Burnett	T. A. Bland ‡W. H. Ragan	Charles Lowder.
1870	Allen Furnas	J. C. Ratliff	Seth W. Pearson ‡W. H. Ragan	Charles Lowder.
1871	Allen Furnas	J. C. Ratliff	W. H. Ragan	Charles Lowder.
1872	J. C. Ratliff	I. S. Jessup	W. H. Ragan	Charles Lowder.
1873	J. C. Ratliff	I. S. Jessup	J. G. Kingsbury	Charles Lowder.
1874	J. C. Ratliff	*I. S. Jessup	W. H. Ragan	Charles Lowder.
1875	Joseph Gilbert	J. A. Mendenhall	W. H. Ragan	Charles Lowder.
1876	Joseph Gilbert	*J. A. Mendenhall	W. H. Ragan	Charles Lowder.
1877	Sylvester Johnson	J. M. Bulla	W. H. Ragan	Daniel Cox.
1878	Sylvester Johnson	J. M. Bulla	W. H. Ragan	Daniel Cox.
1879	Sylvester Johnson	*J. M. Bulla	W. H. Ragan	Daniel Cox.
1880	Sylvester Johnson	S. Burnett	W. H. Ragan	Daniel Cox.
1881	Sylvester Johnson	*S. Burnett	W. H. Ragan	Daniel Cox.
1882	Sylvester Johnson	J. B. Elliot	W. H. Ragan	Daniel Cox.
1883	Sylvester Johnson	C. M. Hobbs	¶W. H. Ragan †C. M. Hobbs	Daniel Cox.
1884	Sylvester Johnson	E. Y. Teas	C. M. Hobbs	Daniel Cox.
1885	Sylvester Johnson	E. Y. Teas	C. M. Hobbs	Daniel Cox.
1886	Sylvester Johnson	E. Y. Teas	C. M. Hobbs	Daniel Cox.
1887	Sylvester Johnson	E. Y. Teas	C. M. Hobbs	Daniel Cox.
1888	Allen Furnas	W. A. Workman	C. M. Hobbs	Daniel Cox.
1889	*Allen Furnas	J. C. Stevens	C. M. Hobbs	Daniel Cox.
1890	J. C. Ratliff	Joe A. Burton	C. M. Hobbs	*Daniel Cox. †S. Johnson.
1891	E. J. Howland	Joe A. Burton	W. H. Ragan	W. A. Workman.
1892	E. J. Howland	E. Y. Teas	W. H. Ragan	W. A. Workman.
1893	C. M. Hobbs	E. Y. Teas	W. H. Ragan	W. A. Workman.
1894	C. M. Hobbs	E. Y. Teas	W. H. Ragan	F. Beeler, Sr.
1895	C. M. Hobbs	E. Y. Teas	W. H. Ragan	*F. Beeler, Sr.
1896	C. M. Hobbs	E. Y. Teas	Jas. Troop	Isham Sedgwick.
1897	C. M. Hobbs	E. Y. Teas	Jas. Troop	Isham Sedgwick.
1898	C. M. Hobbs	E. Y. Teas	Jas. Troop	Sylvester Johnson.
1899	C. M. Hobbs	E. Y. Teas	Jas. Troop	Sylvester Johnson.
1900	C. M. Hobbs	Mrs. W. W. Stevens	Jas. Troop	Sylvester Johnson.
1901	C. M. Hobbs	Mrs. W. W. Stevens	Jas. Troop	Sylvester Johnson.
1902	W. W. Stevens	E. B. Davis	W. B. Flick	Sylvester Johnson.
1903	W. W. Stevens	H. H. Swaim	W. B. Flick	Sylvester Johnson.
1904	W. W. Stevens	H. H. Swaim	W. B. Flick	Sylvester Johnson.
1905	H. H. Swaim	W. C. Reed	W. B. Flick	L. B. Custer.
1906	H. H. Swaim	W. C. Reed	W. B. Flick	S. A. Hazelett.
1907	W. C. Reed	L. B. Custer	W. B. Flick	S. A. Hazelett.

*Deceased.
‡Corresponding Secretary.
†Appointed to vacancy.
¶Resigned.

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CONSTITUTION AND BY-LAWS

OF THE

INDIANA HORTICULTURAL SOCIETY

CONSTITUTION.

Article I. This organization shall be known as the Indiana Horticultural Society.

Article II. The objects of the Society are to develop facts and promulgate information pertaining to the science and art of horticulture.

Article III. Its officers shall consist of a President, a Vice-President, Secretary, Treasurer, and Executive Committee of three.

Article IV. There shall be a Committee on Horticulture consisting of one member from each Congressional District, elected annually.

Article V. Its members shall consist of annual members, paying a fee of one dollar per annum into the treasury of the society except as provided in By-Laws, and honorary members, who shall be elected by the Society for merit as horticulturists of distinction, who may, at pleasure, participate in the deliberations of the Society. Members' wives will be members without fee.

Article VI. Each member shall be entitled to a copy of the transactions of the Society as often as the same shall be published.

Article VII. The Treasurer shall not disburse money except on the order of the Secretary, countersigned by the President.

Article VIII. The Executive Committee shall require of the Treasurer such security as may be deemed sufficient for the safe keeping of the funds of the Society.

Article IX. The seal of the Society shall consist of an outer rim, embracing the inscription, "Indiana Horticultural Society;" within this, and above the central figure, consisting of a vase of flowers, a pear and apple resting upon a section of vine with its fruit, the words, "Organized 1860;" below, "Incorporated 1875."

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BY-LAWS.

I. The President shall preside at all meetings of the society; he, together with the Secretary, shall have power to call meetings of the Executive Committee; he shall present to the Society in his annual address such suggestions and recommendations as may seem appropriate, and shall appoint all special committees unless otherwise directed by the Society.

II. The Vice-President shall preside in the absence of the President. Each member of the Committee on Horticulture shall make annual reports to the Society, embracing such suggestions and recommendations as may to him seem best for the promotion of the horticultural interests of said district, and he shall give such attention to the organization and building up of local societies in his district as may be within his power.

III. The Secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all money received from members, or otherwise, to the Treasurer, on his receipt; shall receive and answer all communications addressed to the Society; establish and maintain correspondence with all local, county, district and State horticultural societies, and secure by exchange their transactions, as far as possible, to aid the President, as an executive officer, in the dispatch of business relating to the meetings of the Society, preparing and publishing circulars and notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of the transactions for the current year. He shall also act as librarian of the Society, and shall have the care and custody of its room and its property, under such regulations as may be adopted for the government thereof.

IV. The Treasurer shall receive and hold all funds of the Society, paying out the same only as prescribed by the Constitution. Before entering upon his duties he shall give bond to the Society in the sum of two thousand dollars ($2,000) for the faithful performance of such duties.

V. The officers shall be elected annually, by a ballot vote, and shall serve until their successors are elected and qualified.

VI. The objects of the Society being to collect, condense and collate information relative to varieties of fruits and other horticultural products, and dispense the same among the people of the State, every member shall pay into the treasury one dollar a year for the purpose of publishing and other expenses: Provided, That members of local horticultural societies may become members by paying into the treasury, through their respective local organizations, the sum of fifty cents each. Any person interested

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in horticulture may become a member by forwarding to the Treasurer or Secretary the fee of membership.

VII. The President, Secretary and Executive Committee may call a meeting of the Society at any time and place they may consider advisable by a notice of thirty days in the public press, or by circulars properly distributed.

VIII. This Society shall hold an annual meeting on the first Wednesday in December of each year, and at such place as the Society shall designate at its previous meeting, and semi-annual and called meetings may be held as provided for in the preceding section.

IX. The officers of this Society shall constitute a Board of Horticulture, five of whom shall be a quorum for the transaction of business, the officers of the Society to be officers of the Board, said Board to meet immediately on the adjournment of the Society, and afterward on its own adjournment. It shall be the duty of the Board of Horticulture to investigate all accounts or claims against the Society when presented for payment; to collect horticultural information, for which it may employ an agent, or agents, to visit different portions of this or adjoining States, and may draw on the treasury for money to pay the necessary expenses, when there is money in the treasury not otherwise needed, and said Board shall make full and definite report of its proceedings to the next regular meeting of the Society.

X. These by-laws may be amended and otherwise changed at any regular meeting of the Society by a majority vote.

XI. The thirteen congressional districts as now (1902) existing shall constitute the several horticultural districts as provided for in Article IV of the Constitution.

XII. The Legislative Committee shall consist of three members, to serve, respectively, three years: Provided, That the present Committee (1906), of which W. B. Flick shall serve one year, C. M. Hobbs two years, and J. J. W. Billingsley three years.

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LIST OF MEMBERS

OF THE

Indiana Horticultural Society

For 1907

LIFE MEMBERS.

Name.	*Postoffice.*	*County.*	*When became Members.*
Burton, Joe A	Mitchell	Lawrence	1885
Butler, Prof. A. W	Indianapolis	Marion	
Conley, John	Richmond	Wayne	
Cowing, Granville	Muncie	Delaware	1877
*Fletcher, Calvin	Indianapolis	Marion	
Hobbs, C. M	Bridgeport	Marion	1875
Kane, Morgan	Mitchell	Lawrence	
Morris, Thomas B	Richmond	Wayne	
Ragan, W. H	Washington, D. C	(Charter Member)	1860
Ratliff, Joseph C	Richmond	Wayne	1863
Shanklin, A. Y	Bringhurst	Carroll	1890
Teas, E. Y	Centerville	(Charter Member)	
Woods, Arthur Earl	Clayton	Hendricks	

HONORARY MEMBERS.

Name.	*Postoffice.*
Bailey, Dr. L. H	Ithaca, N. Y.
Beach, Prof. S. A	Ames, Iowa.
Burrill, Prof. T. J	Champaign, Ill.
Craig, Prof. John	Ithaca, N. Y.
Dunlap, Hon. H. M	Savoy, Ill.
Dunlap, Mrs. H. M	Savoy, Ill.
Farnsworth, W. W	Waterville, Ohio.
Garfield, Chas. W	Grand Rapids, Mich.
Green, W. J	Wooster, Ohio.
Hale, Hon. J. H	South Glastonbury, Conn.

*Deceased,

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Name.	*Postoffice.*
Keach, James L.	Indianapolis, Ind.
Lazenby, Prof. W. B	Columbus, Ohio.
*Sanders, Edgar	Chicago, Ill.
Stanton, J. W	Richview, Ill.
Taft, Prof. L. R	Agricultural College, Mich.
VanDeman, Prof. H. E	Washington, D. C.
Williard, S. D	Geneva, N. Y.

ANNUAL MEMBERS.

Name.	*Postoffice.*	*County.*	*Year.*
Albertson, Emory	Long Beach, Cal.		
Albertson, Mrs, Emory	Long Beach, Cal.		
Aiken, W. W	Franklin	Johnson	1901
Aiken, Mrs. W. W	Franklin	Johnson	1901
Alward, Geo. W	South Bend	St. Joseph	1904
Anderson, E. D	Mentone	Kosciusko	
Anderson, Mrs. E. D	Mentone	Kosciusko	
Anderson, O. C	Mentone	Kosciusko	
Anderson, Mrs. O. C	Mentone	Kosciusko	
Andrews, Wm. H	Lagrange	Lagrange	
Andrews, Mrs. Wm. H	Lagrange	Lagrange	
Apple, John W	Oaklandon	Marion	1875
Apple, Mrs. John W	Oaklandon	Marion	1875
Arbuckle, Alvin	Clermont	Marion	1905
Arbuckle, Mrs. Alvin	Clermont	Marion	1905
Allen, D	Greencastle	Putnam	1905
Allen, Mrs. D	Greencastle	Putnam	1905
Atwood, J. G. B	Albion	Noble	1906
Atwood, Mrs. J. G. B	Albion	Noble	1906
Baldwin, T. A	Oxford	Benton	
Baldwin, Mrs. T. A	Oxford	Benton	
Bartholomew, H. S. K	Goshen	Elkhart	1903
Bartholomew, Mrs. H. S. K	Goshen	Elkhart	1903
Bash, C. S	Fort Wayne	Allen	1903
Bash, Mrs. C. S	Fort Wayne	Allen	1903
Barnett, W. J	Charleston	Clark	1905
Barnett, Mrs. W. J	Charleston	Clark	1905
Barr, R. J	Washington	Daviess	

*Deceased.

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Name.	Postoffice.	County.	Year.
Barr, Mrs. R. J	Washington	Daviess	
Baugher, Nelson	Valentine	Lagrange	1905
Baugher, Mrs. Nelson	Valentine	Lagrange	1905
Beaver, John M	Glenwood	Rush	1906
Beaver, Mrs. John M	Glenwood	Rush	1906
Beck, R. L	Liberty	Fayette	1903
Beck, Mrs. R. L	Liberty	Fayette	1903
Beckett, W. P	Aurora	Dearborn	1906
Beckett, Mrs. W. P	Aurora	Dearborn	1906
*Bell, W. A	Indianapolis	Marion	1905
Bell, Mrs. W. A	Indianapolis	Marion	1905
Bell, E. H	Richmond	Wayne	1905
Bell, Mrs. E. H	Richmond	Wayne	1905
Berryman, W. L	Tipton	Tipton	1896
Berryman, Mrs. W. L	Tipton	Tipton	1896
Beeler, John	Zionsville	Boone	1905
Beeler, Mrs. John	Zionsville	Boone	1905
Beuoy, Ran	Matthews	Grant	1891
Beuoy, Mrs. Ran	Matthews	Grant	1891
Bermaner, Dr. Joe M	Bridgeport	Marion	1905
Bermaner, Mrs. Joe M	Bridgeport	Marion	1905
Billingsley, Samuel	Greenwood	Johnson	1904
Billingsley, Mrs. Samuel	Greenwood	Johnson	1904
Billingsley, J. J. W	Malott Park	Marion	
Billingsley, Mrs. J. J. W	Malott Park	Marion	
Biliter, Ben. F	Huntington	Huntington	
Biliter, Mrs. Ben. F	Huntington	Huntington	
Blasdel, Amos	Broad Ripple	Marion	1904
Blasdel, Mrs. Amos	Broad Ripple	Marion	1904
Blue, E. F	Indianapolis	Marion	1903
Blue, Mrs. E. F	Indianapolis	Marion	1903
Bogue, A. H	Lima	Lagrange	1903
Bogue, Mrs. A. H	Lima	Lagrange	1903
Bricker, Enos	Brimfield	Noble	
Bricker, Mrs. Enos	Brimfield	Noble	
Bridges, John M	Dugger	Sullivan	
Bridges, Mrs. John M	Dugger	Sullivan	
Buck, H. F	Elberfeld	Warrick	1904
Buck, Mrs. H. F	Elberfeld	Warrick	1904
Bullock, L. O	Lagrange	Lagrange	

*Deceased.

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Name.	*Postoffice.*	*County.*	*Year.*
Bullock, Mrs. L. O	Lagrange	Lagrange	
Burkhart, Andrew	Martinsville	Morgan	1906
Burkhart, Mrs. Andrew	Martinsville	Morgan	1906
Burris, J. B	Cloverdale	Putnam	
Burris, Mrs. J. B	Cloverdale	Putnam	
Campbell, Geo. B	Bloomington	Monroe	
Campbell, Mrs. Geo. B	Bloomington	Monroe	
Cantley, J. M	Logansport	Cass	1905
Cantley, Mrs. J. M	Logansport	Cass	1905
Carr, Prof. J. W	Anderson	Madison	1904
Carr, Mrs. J. W	Anderson	Madison	1904
Case, Riley C	Lagrange	Lagrange	
Case, Mrs. Riley C	Lagrange	Lagrange	
Case, R. L	South Milford	Lagrange	1906
Case, Mrs. R. L	South Milford	Lagrange	1906
Cavanaugh, H	Wolcottville	Lagrange	1903
Chilton, Joseph	Brookston	White	1908
Chilton, Mrs. Joseph	Brookston	White	1908
Clark, Ed. J	Shelbyville	Shelby	1903
Clayton, Wm. H	Wolcottville	Lagrange	1905
Clayton, Mrs. Wm. H	Wolcottville	Lagrange	1905
Coffin, J. F	Greenfield	Hancock	1905
Coffin, Mrs. J. F	Greenfield	Hancock	1905
Cole, B. F	Trafalgar	Johnson	1902
Cole, Mrs. B. F	Trafalgar	Johnson	1902
Coleman, S. S	Fort Wayne	Allen	1903
Coleman, Mrs. S. S	Fort Wayne	Allen	1903
Conger, Sid	Shelbyville	Shelby	1902
Corbly, Mrs. Lida	Indianapolis	Marion	
Cotton, I. N	Indianapolis	Marion	
Copeland, David F	Bridgeport	Marion	1906
Copeland, Mrs. David F	Bridgeport	Marion	1906
Crawford, John	Covington	Fountain	1906
Crawford, Mrs. John	Covington	Fountain	1906
Custer, L. B	Logansport	Cass	1870
Custer, Mrs. L. B	Logansport	Cass	1870
Carver, Jas. W	Greencastle	Putnam	1905
Carver, Mrs. Jas. W	Greencastle	Putnam	1905
Darlington, Zeba	Pendleton	Madison	1902
Darlington, Mrs. Zeba	Pendleton	Madison	1902

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Name.	*Postoffice.*	*County.*	*Year.*
Daubenspeck, J. W	Mattsville	Hamilton	1905
Daubenspeck, Mrs. J. W	Mattsville	Hamilton	1905
Davis, Mrs. B. A	Laporte	Laporte	1894
Daugherty, Deolan	Cambridge City	Wayne	1905
Daugherty, Mrs. Deolan	Cambridge City	Wayne	1905
Davis, Evan B	Danville	Hendricks	1901
Davis, Mrs. Evan B	Danville	Hendricks	1901
Deal, L. E	Lagrange	Lagrange	1905
Deal, Mrs. L. E	Lagrange	Lagrange	1905
DeVilbis, W. T	Fort Wayne	Allen	
DeVilbis, Mrs. W. T	Fort Wayne	Allen	
DeVore, E. A	Indianapolis	Marion	
DeVore, Mrs. E. A	Indianapolis	Marion	
Dietrick, John J	Borden	Jackson	1905
Dietrick, Mrs. John J	Borden	Jackson	1905
Dinsmore, Joe S	Bloomington	Monroe	
Dinsmore, Mrs. Joe S	Bloomington	Monroe	
Doan, John L	Westfield	Hamilton	1904
Doner, Fred J. Jr	Lafayette	Tippecanoe	
Doner, Mrs. Fred J. Jr	Lafayette	Tippecanoe	
Eaton, Mrs. Josiah	Lagrange	Lagrange	1904
Eickhoff, Ed. A	Wanamaker	Marion	1873
Eickhoff, Mrs. Ed. A	Wanamaker	Marion	1873
Eller, Thomas	Bloomington	Monroe	
Eller, Mrs. Thomas	Bloomington	Monroe	
Eshelman, A. L	Wolcottville	Lagrange	
Eshelman, Mrs. A. L	Wolcottville	Lagrange	
Eshelman, Henry	Wolcottville	Lagrange	
Eshelman, Mrs. Henry	Wolcottville	Lagrange	
*Eshelman, Levi	Wolcottville	Lagrange	
Eshelman, Mrs. Levi	Wolcottville	Lagrange	
Eshelman, L. L	Wolcottville	Lagrange	
Eshelman, Mrs. L. L	Wolcottville	Lagrange	
Eshelman, Adrian C	Wolcottville	Lagrange	1906
Eshelman, Mrs. Adrian C	Wolcottville	Lagrange	1906
Ellison, Mrs. R	Lagrange	Lagrange	
Evans, James B	Bluffton	Wells	1904
Evans, Mrs. James B	Bluffton	Wells	1904

*Deceased.

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Name.	*Postoffice.*	*County.*	*Year.*
Febles, George	Kendallville	Noble	
Febles, Mrs. George	Kendallville	Noble	
Fess, Fred	Bloomington	Monroe	
Fess, Mrs. Fred	Bloomington	Monroe	
Fisher, Eugene	Lagrange	Lagrange	1905
Fisher, Mrs. Eugene	Lagrange	Lagrange	1906
Fitzpatrick, Mrs. Laura	Whiteland	Johnson	
Flanner, Frank W	Indianapolis	Marion	
Flanner, Mrs. Frank W	Indianapolis	Marion	
Flick, W. B	Lawrence	Marion	1876
Flick, Mrs. W. B	Lawrence	Marion	1876
Foote, Henry G	Albion	Noble	1903
Foote, Mrs. Henry G	Albion	Noble	1903
Foote, C. W	South Bend	St. Joseph	1903
Foote, Mrs. C. W	South Bend	St. Joseph	1903
Forbes, F. A	Plymouth	Marshall	1905
Forbes, Mrs. F. A	Plymouth	Marshall	1905
Fowler, Jas. R	Monticello	White	1906
Fowler, Mrs. Jas. R	Monticello	White	1906
Frame, J. R	South Bend	St. Joseph	
Frame, Mrs. J. R	South Bend	St. Joseph	
Fry, W. H	Greenwood	Johnson	
Furgeson, L. E	White Pigeon, Mich.		
Furgeson, Mrs. L. E	White Pigeon, Mich.		
Garmire, Marion,	Lagrange	Lagrange	
Garmire, Mrs. Marion	Lagrange	Lagrange	
Garmire, W. H	Lagrange	Lagrange	
Garmire, Mrs. W. H	Lagrange	Lagrange	
Garretson, Amos	Pendleton	Madison	
Garretson, Mrs. Amos	Pendleton	Madison	
Garretson, Chas. A	Pendleton	Madison	
Garretson, David	Pendleton	Madison	1894
Garrett, F. B	Burns City	Martin	1905
Garrett, Mrs. F. B	Burns City	Martin	1905
Garwood, Nathan F	Richmond	Wayne	1906
Garwood, Mrs. Nathan F	Richmond	Wayne	1906
German Kali Works	562 Monadnock Bldg, Chicago, Ill.		
Gloyd, J. D	Fort Wayne	Allen	1903
Gloyd, Mrs. J. D	Fort Wayne	Allen	1903
Goble, Jas. N	Greenfield	Hancock	

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Name.	*Postoffice.*	*County.*	*Year.*
Goble, Mrs. Jas. N	Greenfield	Hancock	
Goepper, Jacob	Haughville Station	Marion	
Goepper, Mrs. Jacob	Haughville Station	Marion	
*Good, M. J	Auburn	Noble	
Good, Mrs. M. J	Auburn	Noble	
Graham, A. A	Liberty	Union	
Graham, Mrs. A. A	Liberty	Union	
Greene, W. T., M. D	Albion	Noble	1904
Greene, Mrs. W. T	Albion	Noble	1904
Grossman, J. C	Bridgeport	Marion	1893
Grossman, Mrs. J. C	Bridgeport	Marion	1893
Gustin, E. R	Peru	Miami	1900
Haines, Noah C	Pendleton	Madison	1896
Haines, Mrs. Noah C	Pendleton	Madison	1896
Haines, H. E	Granger	St. Joseph	1904
Haines, Mrs. H. E	Granger	St. Joseph	1904
Hale, Henry J	Indianapolis	Marion	1890
Hale, Mrs. Henry J	Indianapolis	Marion	1890
Halstead, Wm	Rensselaer	Jasper	
Halstead, Mrs. Wm	Rensselaer	Jasper	
Hardy, Thomas M	Pendleton	Madison	1897
Hardy, Mrs. Thos. M	Pendleton	Madison	1897
Harper, John E	Morristown	Shelby	1905
Hazlette, S. A	Greencastle	Putnam	1902
Hazlette, Mrs. S. A	Greencastle	Putnam	1902
Hartzler, D. J	Topeka	Lagrange	1903
Hartzler, Mrs. D. J	Topeka	Lagrange	1903
Henby, Elijah A	Greenfield	Hancock	
Henby, Mrs. Elijah A	Greenfield	Hancock	
Henby, J. K	Greenfield	Hancock	1885
Henby, Mrs. J. K	Greenfield	Hancock	1885
Henderson, R. D	Carlisle	Sullivan	
Henry, W. H	Laporte	Laporte	1898
Henry, Mrs. W. H	Laporte	Laporte	1898
Hess, Ed	Brook	Newton	1893
Hill, E. W	Winchester	Randolph	1906
Hill, Mrs. E. W	Winchester	Randolph	1906
Hitchcock, Don R	Kimear, Wyoming.		

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Name.	*Postoffice.*	*County.*	*Year.*
Hitchcock, Mrs. Don R	Kimear, Wyoming.		
Hitz, J. E	Indianapolis	Marion	1902
Hitz, Mrs. J. E	Indianapolis	Marion	1902
Hobbs, E. M. C	Bloomington	Washington	
Hobbs, Mrs. E. M. C	Bloomington	Washington	
Hobbs, O. A	Bridgeport	Marion	
Hobbs, Harry	Bridgeport	Marion	
Hoff, Geo. W	Shipshewana	Lagrange	1904
Hoff, Mrs Geo. W	Shipshewana	Lagrange	1904
Hoffman, D. E	Winchester	Randolph	
Hoffman, Mrs. D. E	Winchester	Randolph	
Hoover, John	Spiceland	Henry	
Hoover, Mrs. John	Spiceland	Henry	
Hoover, O. P	Bridgeport	Marion	1903
Hoover, Mrs. O. P	Bridgeport	Marion	1903
Horner, M. E	Lima	Lagrange	1903
Horner, Mrs. M. E	Lima	Lagrange	1903
Howland, Chas. A	Indianapolis	Marion	1860
Howland, Elisha J	Indianapolis	Marion	1860
*Howland, Mrs. Elisha J	Malott Park	Marion	1860
Huey, M. G	South Bend	St. Joseph	
Huey, Mrs. M. G	South Bend	St. Joseph	
Huffman, T. J	Henryville	Clark	1905
Huffman, Mrs. T. J	Henryville	Clark	1905
Huston, Prof. H. A	Chicago, Ill.		
Imes, W. A	Brimfield	Noble	1903
Imes, Mrs. W. A	Brimfield	Noble	1903
Inman, Ira A	Columbus	Bartholomew	1906
Inman, Mrs Ira A	Columbus	Bartholomew	1906
Jackson, W. C	Lagrange	Lagrange	
Jackson, Mrs. W. C	Lagrange	Lagrange	
Jacobs, Chas	Pendleton	Madison	
Jacobs, Mrs. Chas	Pendleton	Madison	
Jarretson, J. A	Montpelier	Blackford	1903
Jarretson, Mrs. J. A	Montpelier	Blackford	1903
Jester, L. N	Colburn	Tippecanoe	
Jester, Mrs. L. N	Colburn	Tippecanoe	
Jones, Isaac B	Pendleton	Madison	1903

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Name.	*Postoffice.*	*County.*	*Year.*
Jones, Mrs. Isaac B.	Pendleton	Madison	1903
Johnson, Sylvester	Irvington	Marion	1860
Johnson, Mrs. Sylvester	Irvington	Marion	1860
Johnson, D. B	Mooresville	Morgan	
Johnson, Mrs. D. B	Mooresville	Morgan	
Johnson, Will	Fort Wayne	Allen	
Johnson, Mrs. E. B	Albion	Noble	1906
Keasy, Ezra	Lima	Lagrange	1904
Keasy, Mrs. Ezra	Lima	Lagrange	1904
Kell, George W	Huntertown	Allen	1902
Kell, Mrs. George W	Huntertown	Allen	1902
Kelley, Samue,l	Letts		1905
Kelley, Mrs. Samuel	Letts		1905
Kelsay, W. A	Fort Wayne	Allen	1903
Keslay, Mrs. W. A	Fort Wayne	Allen	1903
Kimmell, J. C	Ligonier	Noble	1897
Kimmell, Mrs. J. C	Ligonier	Noble	1897
King, Caleb	Richmond	Wayne	1900
King, Mrs. Caleb	Richmond	Wayne	1900
King, Chris	Rushville	Rush	1901
King, Mrs. Chris	Rushville	Rush	1901
Kingsbury, J. G	Irvington	Marion	1870
*Kingsbury, Mrs. J. G	Irvington	Marion	1870
Kinsey, W. E	Salem Center	Steuben	1904
Kinsey, Mrs. W. E	Salem Center	Steuben	1904
Kline, Oliver	Huntington	Huntington	1906
Kline, Mrs. Oliver	Huntington	Huntington	1906
Knaub, Ben	North Vernon	Jennings	
Knaub, Mrs. Ben	North Vernon	Jennings	
Kniblack, Mason	Vincennes	Knox	1908
Kniblack, Mrs. Mason	Vincennes	Knox	1908
Kring, J. W	South Bend	St. Joseph	1903
Kring, Mrs. J. W	South Bend	St, Joseph	1903
Lafuse, W. H	Liberty	Union	
Lafuse, Mrs. W. H	Liberty	Union	
Lampman, O. A	Topeka	Lagrange	
Lampman, Mrs. O. A	Topeka	Lagrange	
Latta, Prof. W. C	Lafayette	Tippecanoe	

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Name.	Postoffice.	County.	Year.
Latta, Mrs. W. C.	Lafayette	Tippecanoe	
Linmen, W. F	Noblesville	Hamilton	
Linmen, Mrs. W. F	Noblesville	Hamilton	
Leaming, Henry	Romney	Tippecanoe	
Leaming, Mrs. Henry	Romney	Tippecanoe	
Leitzman, W. F	Mooresville	Morgan	1882
Lietzman, Mrs. W. F	Mooresville	Morgan	1882
Libey, C. N	Lima	Lagrange	1902
Libey, Mrs. C. N	Lima	Lagrange	1902
Lindley, Chas. N	Salem	Washington	
Lindley, Mrs. Chas. N	Salem	Washington	
Listenfelt, Jacob	Pennville	Jay	1903
Listenfelt, Mrs. Jacob	Pennville	Jay	1903
*Little, James A	Cartersburg	Hendricks	1863
Little, Mrs. James A	Cartersburg	Hendricks	1863
Lockwood, Chas	Southport	Marion	
Lockwood, Mrs. Chas	Southport	Marion	
Lodewick, A. G	Bellville	Ohio	1904
Lodewick, Mrs. A. G	Bellville	Ohio	1904
Louth, C	Lafayette	Tippecanoe	
Low, John W	Topeka	Lagrange	1902
Low, Mrs. John W	Topeka	Lagrange	1902
Lowth, Chas	Lagrange	Lagrange	
Lowth, Mrs. Chas	Lagrange	Lagrange	
Lucas, J. W	Bloomfield	Green	1907
Lucas, Mrs. J. W	Bloomfield	Green	1907
Maish, D. F	Frankfort	Clinton	
Maish, Mrs. D. F	Frankfort	Clinton	
Marsh, David C	Edinburg	Johnson	1903
Marsh, Mrs. David C	Edinburg	Johnson	1903
Martin, Horace	South Bend	St. Joseph	
Martin, Mrs. Horace	South Bend	St. Joseph	
Matthews, George	South Bend	St. Joseph	1903
Matthews, Mrs. George	South Bend	St. Joseph	1903
Mays, C. C	Frankton	Madison	1903
Mays, Mrs. C. C	Frankton	Madison	1903
McCarty, J. H	Huntertown	Allen	
McCarty, Mrs. J. H	Huntertown	Allen	
McClue, Chas	Fremont	Steuben	
McClue, Mrs. Chas	Fremont	Steuben	

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Name.	*Postoffice.*	*County.*	*Year.*
McClure, W. T.	Haughville Station	Marion	
McClure, Mrs. W. T	Haughville Station	Marion	
McCain, A. A.	Indianapolis	Marion	1904
McCain, Mrs. A. A	Indianapolis	Marion	1904
McIntosh, G. W.	Rego	Orange	
McIntosh, Mrs. G. W	Rego	Orange	
Merritt, W	Danville	Hendricks	1905
Merritt, Mrs. W.	Danville	Hendricks	1905
Meyers, R. W.	Bloomington	Monroe	
Meyers, Mrs. R. W	Bloomington	Monroe	
Milhous, J. J	Valley Mills	Marion	1890
Milhous, Mrs. J. J	Valley Mills	Marion	1890
Milhous, Albert H.	Valley Mills	Marion	
Milhous, Mrs. Albert H.	Valley Mills	Marion	
Milhous, J. F.	Bridgeport	Marion	
Milhous, Mrs. J. F.	Bridgeport	Marion	
Miller, Norman,	Marion, Pa.		
Miller, Mrs. Norman	Marion, Pa.		
Mills, J. W.	Lagrange	Lagrange	
Mills, Mrs. J. W.	Lagrange	Lagrange	
Moffett, Frank	Carmel	Hamilton	1902
Moffett, Mrs. Frank	Carmel	Hamilton	1902
Moon, H. E.	Portland	Jay	1905
Moon, Mrs. H. E.	Portland	Jay	1905
Moore, Dr. Henry	Irvington	Marion	
Moore, C. B	Monticello	White	1905
Moore, Mrs. C. B	Monticello	White	1905
Moorehouse, Jno. W.	Albion	Noble	1898
Moorehouse, Mrs. Jno. W	Albion	Noble	1898
Moyer, G. N.	Laketon	Wabash	1901
Moyer, Mrs. G. N	Laketon	Wabash	1901
Mozingo, Miss Mary M.	Marion	Grant	
Mustard, Wm	Indianapolis	Marion	1905
Mustard, Mrs. Wm	Indianapolis	Marion	1905
Nelson, M. J.	Topeka	Lagrange	1903
Nelson, Mrs. M. J	Topeka	Lagrange	1903
Newby, Thos. T.	Carthage	Rush	1890
Newby, Mrs. Thos. T	Carthage	Rush	1890
Newman, R. H	Lima	Lagrange	1900
Newman, Mrs. R. H.	Lima	Lagrange	1900

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Name.	*Postoffice.*	*County.*	*Year.*
Newsom, W. T.	Columbus	Bartholomew	1907
Newsom, Mrs. W. T.	Columbus	Bartholomew	1907
Newton, Geo. F.	South Bend	St. Joseph	
Newton, Mrs. Geo. F.	South Bend	St. Joseph	
Norris, A. D.	Anderson	Madison	1901
Norris, Mrs. A. D.	Anderson	Madison	1901
Nicar, Robt	South Bend	St. Joseph	1906
Nicar, Mrs. Robt.	South Bend	St. Joseph	1906
Nicar, V.	South Bend	St. Joseph	1906
Nicar, Mrs. V.	South Bend	St. Joseph	1906
Osborn, Elam	Economy	Wayne	1903
Osborn, Mrs. Elam	Economy	Wayne	1903
Osborn, John	Richmond	Wayne	1904
Osborn, Mrs. John	Richmond	Wayne	1904
Overman, J. C.	Knightstown	Henry	1903
Overman, Mrs. J. C.	Knightstown	Henry	1903
Parker, Frank	Mound City, Michigan.		
Perry, Alexander	Inglefield	Vanderburgh	
Perry, Mrs. Alexander	Inglefield	Vanderburgh	
Peters, Mrs. Frank W.	New Albany	Floyd	
Peterson, Henry C.	Albion	Noble	
Peterson, Mrs. Henry C.	Albion	Noble	
Pflender, D. C.	Acton	Marion	1905
Phelps, W. W.	Noblesville	Hamilton	
Phelps, Mrs. W. W.	Noblesville	Hamilton	
Price, Lewis	Lagrange	Lagrange	
Price, Mrs. Lewis	Lagrange	Lagrange	
Pulling, John	South Bend	St. Joseph	1906
Pulling, Mrs. John	South Bend	St. Joseph	1906
Philips, Albert N.	Albion	Noble	1906
Philips, Mrs. Albert N.	Albion	Noble	1906
Pollark, Chas. E.	Wawaka	Noble	1906
Pollark, Mrs. Chas. E.	Wawaka	Noble	1906
Randle, H. M.	Greencastle	Putnam	1906
Randle, Mrs. H. M.	Greencastle	Putnam	1906
Ratliff, W. S.	Richmond	Wayne	
Ratliff, Mrs. W. S.	Richmond	Wayne	
Reed, W. C.	Vincennes	Knox	1886

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Name.	*Postoffice.*	*County.*	*Year.*
Reed, Mrs. W. C	Vincennes	Knox	1886
Reed & Fielding	Glenwood	Rush	1865
Reid, Murdoch & Co	Chicago, Ill		1903
Ridgeway, Robert	Amboy	Miami	1903
Ridgeway, Mrs. Robert	Amboy	Miami	1903
Ritterskamp, W. J	Princeton	Gibson	1891
Ritterskamp, Mrs. W. J	Princeton	Gibson	1891
*Robison, E. A	Greenwood	Johnson	
Robison, Mrs. E. A	Greenwood	Johnson	
Robuck, Wesley	Ft. Wayne	Allen	
Robuck, Mrs. Wesley	Ft. Wayne	Allen	
Rockhill, D. K	South Bend	St. Joseph	
Rockhill, Mrs. D. K	South Bend	St. Joseph	
Robbins, Cassandria	Indianapolis	Marion	
Rowe, Chas	Valentine	Lagrange	1903
Rowe, Mrs. Chas	Valentine	Lagrange	1903
Roy, Geo. W	Wolcottville	Lagrange	1904
Roy, Mrs. Geo. W	Wolcottville	Lagrange	1904
Royer, E. E	Lagrange	Lagrange	
Royer, Mrs. E. E	Lagrange	Lagrange	
Royer, C. S	Lagrange	Lagrange	
Ruhl, Benj	Lima	Lagrange	
Ruhl, Mrs. Benj	Lima	Lagrange	
Sanger, S. F	South Bend	St. Joseph	1906
Sanger, Mrs. S. F	South Bend	St. Joseph	1906
Schaeffer, D. B	Lima	Lagrange	1904
Schaeffer, Mrs. D. B	Lima	Lagrange	1904
Sears, C. W	Lagrange	Lagrange	1904
Sears, Mrs. C. W	Lagrange	Lagrange	1904
Schermerhorn, J. M	Brimfield	Noble	1902
Schermerhorn, Mrs. J. M	Brimfield	Noble	1902
Schofield, C. S	Indianapolis	Marion	1904
Schofield, Mrs. C. S	Indianapolis	Marion	1904
Scholl, Jonas	Connersville	Fayette	
Schlotter, J. G	Indianapolis	Marion	1902
Schlotter, Mrs. J. G	Indianapolis	Marion	1902
Secrest, D. L	Laurel	Franklin	1903
Secrest, Mrs. D. L	Laurel	Franklin	1903
Sheridan, James	Fort Wayne	Allen	1904

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Name.	*Postoffice.*	*County.*	*Year.*
Sheridan, Mrs. James	Fort Wayne	Allen	1904
Sherman, E. B	Lima	Lagrange	1906
Sherman, Mrs. E. B	Lima	Lagrange	1906
Shirley, Wm. C	Orleans	Orange	1908
Shirley, Mrs. Wm. C	Orleans	Orange	1908
Shoemaker, A. W	Daleville	Henry	1892
Shoemaker, Mrs. A. W	Daleville	Henry	1892
Shoemaker, E. B	Lagrange	Lagrange	1906
Shoemaker, Mrs. E. B	Lagrange	Lagrange	1906
Shortridge, Prof. A. C	Irvington	Marion	
Shortridge, Mrs. A. C	Irvington	Marion	
Sidwell, Henry	Knightstown	Henry	
Sidwell, Mrs. Henry	Knightstown	Henry	
Simpson & Son, H. M	Vincennes	Knox	1895
Simpson, Mrs. H. M	Vincennes	Knox	1895
Smith, Al B	Garfield	Montgomery	1904
Smith, Mrs. Al B	Garfield	Montgomery	1904
Smith, Chas. C	Lima	Lagrange	1904
Smith, Mrs. Chas. C	Lima	Lagrange	1904
*Smith, Dr. Isaac A	Warren	Huntington	1895
Smith, Mrs. Isaac A	Warren	Huntington	1895
Smith, O. C	Fort Wayne	Allen	1904
Smith, Mrs. O. C	Fort Wayne	Allen	1904
Smith, Walter S	Arlington	Rush	1904
Smith, Mrs. Walter S	Arlington	Rush	1904
Smith, Sumner T	Fort Wayne	Allen	1903
Smith, George P	Lagrange	Lagrange	1906
Smith, Mrs. George P	Lagrange	Lagrange	1906
Snodgrass, J. M	Kirklin	Clinton	1903
Snodgrass, Mrs. J. M	Kirklin	Clinton	1903
Snyder, J. W	Sheldon	Wells	1903
Sorg, Theo	Fort Wayne	Allen	1903
Sorg, Mrs. Theo	Fort Wayne	Allen	1903
Sower, Daniel L	Rome City	Noble	1903
Sower, Mrs. Daniel L	Rome City	Noble	1903
Stanley, Perry J	Albion	Noble	
Stanley, Mrs. Perry J	Albion	Noble	
Starkey, W. D	Zionsville	Boone	1902
Starkey, Mrs. W. D	Zionsville	Boone	1902
Stemple, Milton J	Indianapolis	Marion	1902

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Name.	*Postoffice.*	*County.*	*Year.*
Stemple, Mrs. Milton J	Indianapolis	Marion	1902
Stewart, Prof. Wm	Burlington, Vt.		
Stewart, Mrs. Wm	Burlington, Vt.		
Stevens, Warder W	Salem	Washington	
Stevens, Mrs. Warder W	Salem	Washington	
Stineman, Jonas	McCrawville	Miami	1900
Stineman, Mrs. Jonas	McCrawville	Miami	1900
Stinger, B. F	Charlottesville	Hancock	
Stinger, Mrs. B. F	Charlottesville	Hancock	
Stough, J. F	Lagrange	Lagrange	1903
Stough, Mrs. J. F	Lagrange	Lagrange	1903
Stout, H. M	Trafalgar	Johnson	
Stout, Mrs. H. M	Trafalgar	Johnson	
Stout, Wilbur C	Monrovia	Morgan	1900
Stout, Mrs. Wilbur C	Monrovia	Morgan	1900
Sunderland, Cairie	Muncie	Delaware	1908
Sunderland, Mrs. Cairie	Muncie	Delaware	1908
Swaim, Chas. R	Zionsville	Boone	1903
Swaim, Mrs. Chas. R	Zionsville	Boone	1903
Swaim, H. H	South Bend	St. Joseph	1890
Swaim, Mrs. H. H	South Bend	St. Joseph	1890
Swain, Walter A	Pendleton	Madison	
Swain, Mrs. Walter A	Pendleton	Madison	
Swain, C. E	Pendleton	Madison	
Swain, Mrs. C. E	Pendleton	Madison	
Swain, Wm	Pendleton	Madison	
Swain, Mrs. Wm	Pendleton	Madison	
Swank, Lafayette	Topeka	Lagrange	
Swank, Mrs. Lafayette	Topeka	Lagrange	
Sweet, Jno. S	Albion	Noble	1906
Sweet, Mrs. Jno. S	Albion	Noble	1906
Swift, Evan B	Franklin	Johnson	
Swift, Mrs. Evan B	Franklin	Johnson	
Talbert, Rev. Wm	Albion	Noble	
Talbert, Mrs. Wm	Albion	Noble	
Terry, Wm. C	New Ross	Montgomery	
Terry, Mrs. Wm C	New Ross	Montgomery	
Teagarden, Geo. W	Orleans	Orange	1908
Teagarden, Mrs. Geo. W	Orleans	Orange	1908
Thomas, John L	Pendleton	Madison	

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Name.	*Postoffice.*	*County.*	*Year.*
Thomas, Mrs. John L.	Pendleton	Madison	
Thomas, John	Marion	Grant	
Thomas, Mrs. John	Marion	Grant	
*Thomas, Snead	Marion	Grant	1885
Thomas, W. D.	Connersville	Fayette	
Thomas, Mrs. W. D	Connersville	Fayette	
Thomas, Sylvanus C.	Marion	Grant	1906
Thomas, Mrs. Sylvanus C.	Marion	Grant	1906
Thompson, R. L.	Topeka	Lagrange	1904
Thompson, Mrs. R. L.	Topeka	Lagrange	1904
Thorpe, E. R.	Washington	Daviess	
*Tilson, John	Franklin	Johnson	
Tilson, Mrs. John	Franklin	Johnson	
Troop, Prof. James	Lafayette	Tippecanoe	1884
Troop, Mrs. James	Lafayette	Tippecanoe	1884
Troth, R. A	Orleans	Orange	1902
Troth, Mrs. R. A	Orleans	Orange	1902
Trueblood, Jesse D	West Lafayette	Tippecanoe	
Trueblood, Mrs. Jesse D.	West Lafayette	Tippecanoe	
Tryon, Frank N	Albion	Noble	1906
Tryon, Mrs. Frank N	Albion	Noble	1906
Tucker, W. E.	Lagrange	Lagrange	1906
Tucker, Mrs. W. E.	Lagrange	Lagrange	1906
*Tufts, Elmer G	Aurora	Dearborn	1899
VanKirk, Mrs. Myria	Lagrange	Lagrange	1903
VanKirk, R. E.	Lagrange	Lagrange	1908
Van Winkle, V. L.	Scottsburg	Scott	1908
Van Winkle, Mrs. C. L.	Scottsburg	Scott	1908
Walker, E. J	Sheridan,	Hamilton	1905
Walker, Mrs. E. J.	Sheridan	Hamilton	1905
Waltman, Wm. M.	Bean Blossom	Brown	1903
Waltman, Mrs. Wm. M	Bean Blossom	Brown	1903
Walton, Wm. M	Laporte	Shelby	1908
Webster, J. A.	Mishawaka	St. Joseph	1906
Webster, Mrs. J. A	Mishawaka	St. Joseph	1906
Wells, Merit	Indianapolis	Marion	1901
Wemple, E. C	Valentine	Lagrange	1903
Wemple, Mrs. E. C	Valentine	Lagrange	1903

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Name.	*Postoffice.*	*County.*	*Year.*
West, Jas.	Warren	Huntington	1908
Widney, H. M.	St. Joe	Dekalb	1904
Widney, Mrs. H. M.	St. Joe	Dekalb	1904
White, John T.	Connersville	Fayette	
White, Mrs. John T.	Connersville	Fayette	
Whiteley, Mrs. Isaac	Cambridge City	Wayne	1903
Whipps, Jas	Carlisle	Sullivan	
Williams, Samuel T. S.	Knightstown	Henry	1885
Williams, Mrs. Samuel T. S.	Knightstown	Henry	1885
Williams, W. A.	Rome City	Noble	
Williams, Mrs. W. A.	Rome City	Noble	
Williams, D. A.	19 S. Del., Indianapolis	Marion	
*Williams, Mrs. D. A.	Indianapolis	Marion	
Williams, E. H	Indianapolis	Marion	1906
Williams, Mrs. E. H.	Indianapolis	Marion	1906
Wilson, George S.	Indianapolis	Marion	1908
Wilson, Mrs. George S	Indianapolis	Marion	1908
Wilson, Theo	R. D. 29 Fountain Sq	Marion	
Wilson, Mrs. Theo.	Indianapolis	Marion	
Woolen, Wm. Watson	Indianapolis	Marion	1902
Woolen, Mrs. Wm. Watson	Indianapolis	Marion	1902
Woodworth, J	Lagrange	Lagrange	
Woodbury, Prof. C. G	Lafayette	Tippecanoe	1906
Yoder, W. H	South Bend	St. Joseph	1906
Yoder, Mrs. W. H.	South Bend	St. Joseph	1906
Young, W. S	Franklin	Johnson	
Young, Mrs. W. S.	Franklin	Johnson	
York, E. E.	Plainfield	Hendricks	1906
York, Mrs. E. E	Plainfield	Hendricks	1906
Zion, James M.	Clarkshill	Tippecanoe	1892
Zion, Mrs. James M	Clarkshill	Tippecanoe	1892
Zimmer, H. I	South Bend	St. Joseph	1906
Zimmer, Mrs. H. I.	South Bend	St. Joseph	1906

*Deceased.

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Forty-Sixth Mid-Summer Meeting

OF THE

INDIANA HORTICULTURAL SOCIETY

HELD AT

Purdue Experiment Station, Lafayette, Indiana

August 7 and 8, 1907

The forty-sixth midsummer meeting of the Indiana Horticultural Society was called to order at 1:30 p. m. on Wednesday, August 7, 1907, with President H. H. Swaim in the chair, who said:

President Swaim—Ladies and Gentlemen: The time has now come for the opening of this, our forty-sixth midsummer meeting of the Indiana Horticultural Society. As we have been somewhat delayed in commencing this meeting we will now proceed with the program. The first thing on the program this afternoon is a talk on Frosts, by W. T. Blythe, United States Weather Bureau, Indianapolis, Ind.

CONDITIONS UNDER WHICH FROSTS INJURE VEGETATION AND MEANS OF PREVENTION.

BY W. T. BLYTHE, UNITED STATES WEATHER BUREAU, INDIANAPOLIS, IND.

W. T. Blythe—Mr. President, Ladies and Gentlemen:

Preliminary to a discussion of the ways and means of preventing injury to vegetation by frost, it is well to consider briefly, at least, the conditions most favorable to frost formation. First of all, however, I shall attempt to explain for the benefit of any who may not be fully familiar with the terms, the meaning of relative humidity and dew point.

Relative humidity is a convenient term used to express the amount of moisture in the air as compared with the amount the air would hold if it was completely saturated. That is to say: If the air is completely saturated its relative humidity is 100 per cent, but if it contains only one-half of the amount of vapor that it is capable of holding in suspension, its rela-

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tive humidity is 50 per cent, and so on. Along with this explanation should go the additional information that the percentage of relative humidity does not depend upon the actual amount of moisture in the air, but upon the temperature of the air. To illustrate: When at any time and at any temperature the air is completely saturated, an increase in temperature will increase its capacity for holding moisture, and, if none is added, the relative humidity is decreased. On the other hand, if the temperature of the saturated air is lowered, its capacity for holding moisture in suspension is decreased and precipitation takes place.

The dew point, or, properly speaking, the temperature of the dew point, is that degree of temperature at which begins the condensation of the vapor, which is always present in the atmosphere in greater or less quantities.

The two principal methods by which plants lose their heat are convection and radiation.

The movement of the air is continually bringing new particles of it in contact with the plants, and, if the air is cooler than the plants, it will take from them a portion of their heat until both air and plants are at the same temperature. This is known as convection, and is very effective on windy nights, when a cold or cool wave is approaching and the breeze is continually bringing new portions of the atmosphere about the plants. Cooling by this method, while it does not necessarily produce frost, lowers the temperature of the plants to that of the surrounding air and thus increases the probability of a killing frost should the wind die down and other conditions be favorable.

The chief method, however, by which plants lose their heat, is by radiation. By this term is meant that peculiar process by which heat escapes from an object and passes through the surrounding space in direct lines in the same way rays are emitted from a source of light. Heat lost by radiation does not appreciably warm the air through which the ray passes, but its effects are manifest at any surface which obstructs the passage of the rays.

The surface of the earth is continually losing heat by radiation into space, but during the day it usually receives heat from the sun more rapidly than it loses it by radiation, and consequently it grows warmer. At night, however, heat from the sun is cut off and the continued radiation causes the temperature to fall. Under those circumstances, other conditions being favorable—the sky clear and the wind light—this fall continues until, on the surface of the ground or other exposed surfaces, the dew point is reached and a part of the vapor in the adjacent air is condensed and deposited on the cooled surface. It the temperature of the surface is above the freezing point—32 degrees—the deposit will be in

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the form of water, and, owing to the fact that by the condensation of vapor to water an enormous amount of heat is liberated, the further fall of temperature is retarded, or, possibly, completely checked. But, if the dew point is not reached until the temperature falls below 32 degrees the resulting precipitation will be in the form of frost, snow or hail.

Another element in the formation of frost, which it is well to mention, is found in the fact that air, like fluids, arranges itself according to its density, or weight, thus: The heavier, cold air rests on the surface of the earth, and, during calm nights, flows from the slopes down into depressions, or valleys, and over lowlands, where it accumulates and envelopes plants and trees and causes at time damaging frosts, while vegetation on the hill sides remains uninjured.

The conditions that I have attempted to describe as the most favorable to the formation of frost, it must be remembered, are subject to numerous modifications, and, while it is not possible with our present knowledge of the subject, to lay down a fixed rule for forecasting frost, it is safe to say that during the latter part of a night, with a clear sky and a wind of less than four miles an hour, frost may be expected when the temperature, as reported by stations of the Weather Bureau, falls to 40 degrees or lower. The surface upon which frost is deposited must, of course, possess freezing temperature, but it will be remembered that under the condition of sky and wind just mentioned, the temperature of surfaces near the ground frequently falls to that degree, or lower, although the temperature of the air a few feet above the surface may be several degrees above freezing; and it is the temperature of the air, in many instances several feet above the ground, that is given in the Weather Bureau observations.

In view of what has been said regarding frost formation, it is plain that any action looking to the prevention of injury by frost, to be successful, must be based on one or more of the following methods:

1. Diminishing the radiation of heat.
2. Raising the dew point to a higher degree than 32.
3. Adding heat to the air.
4. Draining the cold air away from the locality that needs protection and
5. Mixing the air so as to prevent the cold air from sinking and settling in the stratum nearest the earth.

Practically all of the literature that has been published on the subject of prevention of injury to fruit by frost has had special reference to the protection of the citrus and semi-tropical fruits grown in Florida and California, and, since the value of a crop taken from an orange grove is so much greater than one taken from an apple or peach orchard covering an equal

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number of acres, many of the methods that have been tried, proved successful and profitable in the case of fruits grown in the states named, are, on account of their expense, prohibitive for the protection of fruits grown in the interior and northern states. Therefore, I shall not attempt to describe, except very briefly, such methods as are known to be impracticable, on account of expense, for use in the protection of the staple fruits and vegetables of the middle states.

The erection of any screen between plants and the open sky tends to intercept the rays of the radiant heat and either deflect them back toward the earth or absorb them, thus raising the temperature of the screen itself, which becomes a radiating surface and returns a portion of its heat to the earth. Any substance, then, which obstructs the passage of heat rays more or less effectively checks the loss of heat by radiation. In greenhouses and hotbeds advantage is taken of the peculiar, but well-known, property of glass, which allows the heat rays of the sun to pass through it and is almost impervious to the dark heat rays from the earth and plants. Glass, therefore, makes one of the most perfect screens, but its cost precludes its use as such, except for the protection of valuable plants and flowers.

Screens of other solid materials have been quite extensively used in protecting vineyards and citrus groves where intense cultivation is practiced, but as said before, the expense of providing such protection is too great to admit of their general use. Strawberries are often protected from spring frosts by covering them with straw, and we are all more or less familiar with the methods practiced by our mothers, wive and daughters, of protecting early garden vegetables and flowers from injury by spreading over them old newspapers and weighting the papers down with a shovelful of earth placed on each corner.

Cranberry-growers flood the marshes when frost is expected. In this instance the protection is probably largely, it not wholly, due to the fact that the high specific heat of water raises the temperature of the air.

For the protection of the staple crops of the interior states generally, however, the use of smoke from smudge fires is probably the best, if not the only successful method that can be extensively practiced with profit, and even this method has not been uniformly successful. For instance, in the Dakotas it is said that excellent protection to wheat fields was obtained, the fuel used to make the smoke being the most convenient material at hand, namely, straw from the previous year's crop, which had been left in the fields and was quite wet. On the other hand, in southern California and Florida, straw was scarce, and crude petroleum, tar and similar smoke producing materials were used for fuel and the results were not, as a rule, satisfactory. Experience, therefore, in the instance cited, as well as numer-

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ous others, indicate that the effectiveness of the smudge method varies with the kind of fuel used to produce the smoke. That is to say, smoke produced by burning tar, coal oil, or like substance, although dense, is dry and the heat of the fire producing it raises the temperature of the air in the immediate vicinity of the fuel many degrees higher than that of the surrounding air. Consequently the heated air is greatly expanded, its density diminished, and it rises rapidly, carrying the smoke with to a height frequently above the trees, whence it is blown away more or less rapidly by the almost constant circulation of the air at such an elevation.

When the fuel used was wet straw, stable manure, or any other moist slow-burning substance that produced a dense vapor-laden smoke, and the fires were properly placed in or near the orchard, almost a perfect screen was formed above and about the trees. The explanation of this phenomenon is that when damp fuel is used a considerable portion of the heat of the fire is expended in evaporating the water in the fuel, and, as the evaporation of water necessitates the expenditure of an immense amount of heat energy it is evident that the updraft in the case of dry fuel is greatly diminished. Consequently the smoke remains nearer the surface where the trees interfere with the movement of the wind and tend to retain the smoke, thus increasing the protection.

Furthermore, as previously stated, when damp fuel is used a considerable portion of the heat from the fire is expended in evaporating the water in the fuel. The vapor thus formed is at first invisible perhaps, but as it distributes itself and expands in the surrounding cooler air its temperature is lowered and a portion of it is condensed, forming a visible fog or mist. Now in the process of condensing, all the heat that was consumed in evaporating the water, again becomes sensible and raises the temperature of the air. By using wet fuel, therefore, we produce not only a screen of smoke but a screen composed of smoke and fog, which, on account of its density hangs low and prevents the radiation of heat from the plants near the surface of the ground and also actually, as said before, increases the temperature of the air to a considerable height above the ground.

While there are other methods whereby radiation may be diminished or checked, such as making screens of glass, or of light wood lattice-work, or of cloth; and of raising the dew point by irrigation, or spraying; also of adding heat to the air by building a sufficient number of small fires advantageously distributed in the orchard, either on the ground or in baskets suspended a few feet above the ground, there is probably no other one scheme that combines so many of the advantages of the other methods as that of wet smudge fires, and certainly none capable of application in all parts of the country at such low cost.

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Having arrived at this conclusion, I will, if you please, quote to you from a bulletin of the Department of Agriculture, a description of some of the materials used to make smudge fires and the manner in which experience has shown that they can be used to the best advantage.

"For stationary fires of damp straw and stable manure the fuel, in small piles, should be distributed throughout the orchard in advance. The more numerous the piles the better. With the same amount of fuel the best protection is obtained from small and frequent fires, because from the small fires the upward draft is reduced to a minimum, and the more frequent the fires the more uniform will be the distribution of heat.

"A decidedly preferable method is to pack damp stable manure in common grain or burlap sacks, by which it can be conveniently handled, and distribute the sacks through the orchard in rows about 100 feet apart and with about 50 feet between sacks in each row. When it is found necessary to protect, a small amount of coal oil is to be poured upon each sack and the fuel ignited. It is usually unnecessary to fire more than every second or fourth sack, the remainder being left for later occasions. These sacks will burn with a smoldering fire for several hours. It is said that the amount of heat which is set free by burning one sack of manure weighing 50 pounds and then condensing the water vapor near the earth is sufficient to raise the temperature 20 degrees in a space 75 feet square. If one-fourth of this added heat remained within the space described, which seems to be a reasonable estimate, ample protection would be obtained under almost any ordinary conditions.

"Wet bales of straw have been substituted for sacks of manure with fair success. One hundred pound bales were cut in four pieces, a tie wire being left about each piece, and when properly dampened, burned, with but little care, causing a smoldering fire."

Prunings of trees also make excellent smudge material and should always be preserved for that purpose. They should be piled in open spaces throughout the orchard or vineyard and burned at such times as protection may be needed. With this, as well as with other materials, the best results are obtained from small fires.

A number of excellent devices have been used in which the smudge fires were built upon some sort of vehicle by which they could be moved about the orchard. The advantages of this plan are several.

First. The fire can be moved to the section where most needed, which is generally along the windward side of the orchard.

Second. The loss of heat, smoke and steam by an upward draft is almost entirely prevented, since the fire does not remain in one position long enough to establish such a draft. On this account much larger, and, consequently, fewer fires, with equal efficiency, are possible.

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Third. There is a much more uniform distribution of heat and smoke throughout the orchard.

A device of this kind said to have been first used by a large fruit company of Visalia, California, about ten years ago, is thus described by the manager of the company:

"We built wire frames (chicken-yard fencing) on our low truck wagons, stretching them from four wagon stakes, and on the wire netting heaped wet manure. Dirt was then thrown on the wagon beds to protect them, and pots of burning tar were set underneath the straw roof. A barrel of water on the wagon was used to keep the straw wet. These wagons were driven about and did the best work, as they could go wherever needed. The smoke and vapor were carried to the rear as the wagon moved, and being at once out of the rising heat, fell close to the ground in a long, white trail. At daylight our whole 400 acres of orchard were covered with a white fog, extending from the ground to about 20 feet high."

Modifications of this device have been used with varying success by many. One of these modifications is a sled constructed for the purpose at a cost of about $2.00 apiece. Each sled consists of runners made of 2x4 scantling six feet long, connected together by a few boards about four feet long. Upon these boards dirt is piled to hold the pot of burning tar, four upright sticks are spiked to the runners, with their tops about 18 inches above the bed of the sled and connected by strips of inch boards 4 to 6 inches wide. To the under edges of these strips, chicken-wire netting is attached, making a box about four feet square and four to six inches deep, with wooden sides and wire bottom, the bottom being about one foot above the top of the bed of the sled, which allows ample space for the vessel containing the burning tar. This rude box, or screen, supports the wet straw or manure used as smudge material. Four of these sleds, two wagons rigged after the plan of those used at Visalia, and about 500 sacks of manure, are said to have successfully protected an orchard of 300 acres belonging to the Rio Benito Orchard Company near Biggs, California, during six successive nights of severe frost at an expense of less than 1 per cent of the value of a crop, which, undoubtedly, would have been lost had it not been protected. It has been pointed out that the wire bottomed box device would be made much more efficient if supported at the center with an arch of heavy, stiff wire passing diagonally from runner to runner and forcing up the bottom of the screen so as to cause it to present a concave surface to the fire, thus causing more of the heat to pass through the smudge material and less to escape upward about the sides of the box. A barrel of water should be carried on the front end of the sled and the smudge material kept wet.

In this State, where a sled is to be found on almost every farm, the

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cost in money and labor of constructing a portable smudge-fire apparatus can not be great.

Prof. Alexander McAdie, of the Weather Bureau, in an excellent paper on the subject, says that the problem of frost fighting is one of a two-fold nature: First, accurate forecasting of the frost period, and second, efficient methods of retarding or stopping the fall of temperature at critical times. To these I would add, or rather insert, another important factor, namely, the prompt, quick and thorough distribution of the Weather Bureau forecasts and special warnings. Having already discussed the methods of protection, only the forecasts and their distribution need attention. Regarding the accuracy of Weather Bureau forecasts, modesty forbids that I say much. However, while fully conscious of the fact that the criticisms of the bureau in which newspaper writers and other individuals sometimes sarcastically indulge seem to be not unwarranted, I can not refrain from expressing the belief that at this date there are but few persons whose interests are affected by changes in the weather who are not willing to admit that the daily forecasts and special warnings are of value to them.

As to the distribution of the forecasts and warnings I can say that in this state alone there are more than 160 places called distributing stations, at which morning forecasts are received by telegraph or telephone before 10 a. m. daily, and to which special warnings of frost, cold waves and severe storms are sent whenever issued, to be distributed to the public by one or more of the methods that have been officially adopted by the bureau for the dissemination of such information.

Of these several methods, publication in the newspapers is, of course, the most efficient in point of general distribution. The distribution by mail, posting copies in postoffices and other public places, placing of copies of the forecasts in rural free delivery wagons, give the information wide circulation. But the quickest way for those who are interested to get the forecast and who have telephone connection with an exchange is the telephone. At every Central Union Telephone exchange and every exchange of other lines with which that company connects in this state the morning forecasts are on file and available, free, to all inquirers at any time after 10 a. m. daily. The same is also true with reference to the exchanges of many independent telephone companies, and farmers co-operative lines. In addition to giving out the forecasts when called for several of the independent telephone companies have arranged for and have in operation a system whereby the forecasts are distributed to all subscribers at one time. Thus, at a fixed hour, say at exactly 10 a. m., a preconcerted signal is sent over each circuit and in one minute or one-half minute thereafter, is followed by the transmission of the weather forecasts over the circuit. The preconcerted signal has become known on such lines

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as the "weather call," and subscribers not only get the weather forecast but, if they desire to do so, may correct their clocks daily.

For the information of the persons who may not know, if there are any such present, I will explain further regarding the morning forecasts that those telegraphed to distributing centers in this state for dissemination by mail, telephone and so on, are based on the results of simultaneous observations taken at about 150 stations in this country and Canada at 8 a. m., 75th meridian time. The reports of these observations are assembled (as well as at many other places), at the district forecast station of the Weather Bureau at Chicago. There the data are charted for study and the forecasts are prepared, and, at about 8:40 a. m. to 9 a. m, local time, filed at the telegraph offices to be wired to the several distributing stations. The forecasts published in the morning newspapers are based on the 8 p. m. observations of the previous day and prepared at the central office of the bureau in Washington and distributed thence through the medium of the press associations.

In conclusion, I would recommend that each orchardist, gardener or grower of any other product that is susceptible of protection from injury by frost at a reasonable cost as compared with the value of the crop: First, get into the closest touch possible with the reports and forecasts of the Weather Bureau. Second, supplement the information received from the Weather Bureau by the addition of his own knowledge, gained by experience and observation, of the effect in his locality of the conditions (particularly of temperature) existing and anticipated, at the nearest Weather Bureau office. Third, be prepared to start his smudge fires whenever the conditions indicate that protection will be needed, and finally, when during the night or early morning that frost is expected the temperature of the air in the orchard or garden, at say 1 to 5 feet above the ground, has fallen to within 2 to 4 degrees of the freezing point, that is to a temperature of 34 to 36 degrees, light the fires and see to it that every section of the area needing protection is covered with smoke and fog and continues so until the sun is well up.

President Swaim—This is certainly an excellent paper, and I doubt not but that some time or other not a man of you here but has wished that he might get hold of the weather man, and now I will give you the opportunity to talk with him. Please be free to speak if you have any remarks to make on this line, and we may then have a discussion.

W. T. Blythe—I would like to ask that Mr. Milhous, Valley Mills, Ind., relate his experience with fires last spring to protect his crop.

Mr. Milhous—I am in touch with the weather man every day, to my benefit. Last spring we had quite a large number of tomato plants out and

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we valued them very highly. One day I made up my mind that there was trouble ahead after I had seen the weather map, and I thought I would better see the weather man and so I went to see him. He told me that the best he could draw from the map was that I was in danger of a killing frost. I bought a barrel of pitch and took it home with me, and got ready for business. Now, I had two tomato patches and they were about two miles apart. I told the boys that they might take care of the patch at home and I would look after the other one. I could not keep the smoke over my patch all of the time on account of the wind; sometimes it was right and sometimes it wasn't, and would carry the smoke away from the patch instead of over it, but the boys at home smoked all around their patch. At first the boys could not get smoke enough and the thought occurred to them that they would get a load of straw which was very wet and then they went to the grist mill, close by, and got a wagon load of corn cobs; then they saturated some of these with coal oil, after they had been put into a basket, and set fire to them. When they were burning they put some of the wet straw over the basket. They built the fires all around the patch for fear of a change in the wind. The mercury stood at 29 right at the edge of the patch, probably a foot from the ground, but the fog and the smoke was so dense over all the two-and-one-fourth acres of plants that you couldn't see a man two rods inside the patch; looking south towards the wind you could see two miles. They made so much smoke that the air was simply full of it, and for quite a distance north. The result was that in the patch where the boys were working there was not a single plant injured by the frost; but in the patch that I had charge of, where the wind kept changing, there were quite a number bitten by the frost; but I think that if I hadn't used the smoke a large majority of them would have been destroyed. I also believe that the patch that the boys took care of would have been practically destroyed had it not been for the smoke. When I found that I could save my plants by this method I became convinced that we could save our orchards to some extent in the same way, just as well as not, if we would only build fires in and around them. I shall not be afraid after this to plant my tomato seeds at least a week earlier and risk saving them by this method, and the corn cobs and the wet straw have given the most practical results of anything we have ever tried.

Secretary Flick—Are they better than pitch?

Mr. Milhous—Yes, for this reason: If you cover the pitch up with the wet straw it will go out, but the corn cobs will burn all the time. And it seems to me that it makes a more dense fog; and then, another thing, it is so much cheaper, because you have to pay $3.50 for a barrel of pitch and corn cobs cost sixty cents, and the coal oil doesn't cost much, as I probably

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didn't use over two gallons. Make a smoke on all sides of the patch, so that if the current of air does change you are safe anyhow, because you couldn't go to work then and change all of your fires and then run the risk of the wind changing again. You must be ready all around your patch.

President Swaim—Has any one else a word to say on this subject?

Mr. Houston—I want to call attention to the fact that there is ten million acres of ideal material for making this fog scattered around in the country. There must be one hundred and fifty square miles of it scattered around Lake Michigan. It is muck, but it is ideal stuff for making smudge fires.

Mr. Ritterskamp—One point in placing canvas over plants for a screen is worth mentioning; that is to leave space between the foliage of the plants and the canvas so that they do not touch. The foliage is sometimes turned black by frost when in contact with the canvas.

President Swaim—Do you mean to say that the plants will be killed under the canvas?

Mr. Ritterskamp—Yes, sir; the foliage that was touched by the canvas. It would be best to have the canvas higher up and allow circulation.

W. T. Blythe—Yes, sir. In all cases the screen should be a little above the plant.

Mr. Ritterskamp—Where there was no screen the plants were not injured a particle.

Mr. Snodgrass—I would like to have a scientific explanation of why the frost settles on dry material and does not affect it if it happens to be wet. A plant will take frost where there is dry straw and will not where there isn't any.

W. T. Blythe—Frost will form on dry material when it will not on wet material, for the reason that wet material is warmer on account of the latent heat in the moist substance.

Mr. Snodgrass—Then the circulation of the sap would not have anything to do with it?

W. T. Blythe—The sap itself has something to do with it, but not because of the circulation.

Mr. Ritterskamp—One year we covered our strawberry plants and we found that the frost settled on them and injured the blossom.

W. T. Blythe—I would stir up the atmosphere.

Mr. Snodgrass—I want to make a statement and ask why it is so. One of my neighbors had a large bed of tomatoes planted on his place last

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spring. He had a plank about 6 or 8 inches wide nailed along the sides of it, but there was a space of about three inches on one side near the bottom left open. Now he left this space on the under side open and he said that the freezing did not affect his plants one bit. I didn't know whether this was true or not, and I wanted to know about it. I am just a little afraid to try it. I would like to know if that open space at the ground is any protection to the plants?

W. T. Blythe—In my opinion it is not.

President Swaim—I think that this is all of the time that we can devote to this subject at this time. Dr. Stone is with us, and I presume that his time is very valuable, and while he is here we would like to have a few remarks from him.

Dr. Stone—Mr. President, Ladies and Gentlemen: The words of welcome that I was supposed to say this morning have been deferred until after the reading of the first paper, on "Frosts," I suppose, in order to combat the effects of the reading of this paper. A welcome to Purdue University is, after all, not a matter of any particular part of this program. Citizens of Indiana are always welcome to come to Purdue, either in the capacity of members of the college or any other way. We feel that these meetings ought to be held here more and more, for there ought to be something of interest in Purdue, and then we have an excellent place for you to hold your meetings. There should be something of interest in Purdue for all of these kinds of meetings and conventions and associations, and we like to have you come to visit. I am sure, personally, that that feeling is extended toward the horticulturists as much as any other kind of people in this state. And I have noticed that Purdue University can serve the people of this state in the long run better than any other way by doing what it can to promote those phases of agriculture, such as horticulture and dairying. The time has passed when the farmer should devote himself entirely to the raising of beef and hogs and corn and wheat, not that they are not profitable, but that there are other things which should claim his attention as well. We want horticulture encouraged, and we feel that this institution should be doing a good deal toward that end. And so I am glad to see you come here to hold your summer meeting, and I hope you will come again and again, and I hope that we will be able to serve your association, and that all of our state will be interested in horticulture in some practical and beneficial way. I hope that you will have a good time while you are here and that you will take the time to visit all of the places of instruction. This institution is to serve the people of the state in every way it can, and if we fail sometimes it is not from lack of desire to serve the people, but perhaps from lack of co-operation, and we

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feel that you should come to us and criticize and make suggestions, and we will be glad of any honest criticism.

I hope that your programme will go on during the day or two that you are here with great profit and benefit to you and all, and I hope myself to hear more or less of the papers read.

With these few words of welcome we will turn over to you for your use Purdue University as long as you stay, and we invite you to come again. I thank you. (Applause.)

President Swaim—I think the next subject is very appropriate, following the remarks of Dr. Stone: "Co-operative Horticultural Work of the Experiment Station," by Prof. C. G. Woodbury, of the Purdue Experiment Station.

Prof. C. G. Woodbury—It has been suggested to me that it would be of interest to the members of the society to have an outline of the plan of the Horticultural Department of the Experiment Station, and I am glad to have this opportunity.

CO-OPERATIVE WORK IN HORTICULTURE.

BY PROF. C. G. WOODBURY.

It has been suggested that it would be of interest to the members of the society to have outlined to them the plans of the horticultural department of the station. I am very glad of this opportunity to present to the society some of the purposes and ideas of the department, and with your permission I shall not confine myself wholly to the subject of co-operative work, but will also discuss very briefly what I conceive to be the proper attitude of the department to the fruit growers of the state as individuals, and to the Horticultural Society as a whole. With respect to the experimental work now under way, you will pardon me if my outline be only general in its nature, since most of the work is only getting fairly started, and in the majority of cases it is yet too early to announce results. With reference to the work of the station, then; in the first place, let it be understood that I do not conceive its functions to be entirely circumscribed by the line of activity suggested by its name. That is to say that, in my opinion, the Horticultural Department of the Experiment Station has a somewhat wider field of usefulness than that bounded purely and simply by experimental work. I do not wish to be understood for a moment as being one who would underrate the primary importance of experimental work. Among all the branches of station activity this work is doubtless fundamental, and of greater importance than any other to the people of the state. I do wish to state, however, and emphasize by dwelling upon it at some length, the point that there are *other* legitimate fields of usefulness, to state what

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some of these are, and to point out the plans of the department in regard thereto. We believe that the usefulness of the department to the people of the state may be threefold; experimental, demonstrational, and educational. The latter two might be classed together, but I think there is a distinction which may be recognized. By experimental work in this connection I wish to be understood as meaning the investigation of the more abstruse problems of horticulture—research work, rather than work which aims at quick results of immediate commercial availability. By far the greater part of the latter class of work is really demonstrational in its nature. Demonstration work differs then from experimental work proper in being usually of shorter duration (from a few minutes to one or two years), and in aiming to instruct by proving and clinching a fact already known, rather than in aiming to settle some hitherto unknown point. As I remarked before, demonstration work and educational work necessarily overlap somewhat, so that it is difficult to make a hard and fast distinction, but, roughly speaking, I would place spraying demonstrations, neighborhood experiments, the larger part of variety testing, and a large part, but not all, of co-operative work, in the former class, while under educational work proper, come institute instruction, county and state fair exhibitions, correspondence, insect and disease identification, etc.

Because what I have classified as demonstration work may not be of such great scientific value to the world at large as research work, it does not follow that it may not be of as great or greater practical value to the commercial fruit grower. The value of demonstration work to you depends largely upon how much you know already, and in my study of the conditions in the state, since becoming connected with the station, it has seemed to me that there is a very present and crying need for instruction among the body of our fruit growers in the more elementary operations. In other words, it is important at present to get the people to do as well as they already know, as it is to seek new fields of study. Of course we all realize that neither side can be neglected, but it is to the need for more of this elementary experimentation or demonstration work that I wish especially to call your attention.

In regard to the co-operative work of the department, then, I would say that it is at the present time, and will be in the future, the policy of the department to assist the fruit growers of the state by personal visits and consultation in the orchard, by advice, correspondence, and supervision where desirable, of the plans and work of individuals, and in every other way to further the horticultural interests of the state. You will readily see that this involves much. It means first of all a closer acquaintance of the fruit growers of the state and the Horticultural Department of the Station, and it also involves extensive investigations into the present con-

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dition of the fruit-growing interests. It is a fact more and more coming to be recognized, and in truth is almost axiomatic in its nature, that the special problems presenting themselves to the growers in different parts of the state can best be solved by work done in the immediate localities in which the results are to be applied. Of course we all realize that there are unsolved problems of state-wide application—problems of insect control, cultivation, storage, and marketing. But the principle remains, and it is true that the conditions obtaining in Perry and Posey and Dearborn counties are different from those in Steuben and Elkhart and St. Joseph. We need not go from end to end of the state either for illustrations. The conditions in Lake county differ considerably from those in Tippecanoe. Speaking of Lake county, anyone who saw the magnificent exhibition of Huntsman apples made here at the Farmers' Short Course last winter, which were grown in the central part of Lake county, cannot doubt the possibilities of that region in the production of good fruit.

In order for the Horticultural Department of Purdue Experiment Station to be able to be of the greatest benefit to the fruit growers, we desire to be able to carry out careful and systematic experiments in the immediate locality which is to benefit by the solution of whatever special problem is under consideration. It is in work of this kind that co-operative experimentation finds its widest and most effective field, for it is only when problems of local importance are under investigation that sufficient interest is aroused to carry on such work successfully. I believe it to be important that the department be furnished the necessary means to prosecute such work. Further, I consider that it should be a useful and interesting part of our business to demonstrate by means of co-operative experimental work, what success can be obtained in different parts of our state in various lines of commercial horticulture—whether it be the making of from $300 to $600 per acre in apple growing, or $300 per acre in strawberries, or $400 in tomatoes, or $300 to $400 in currants and blackberries, or a similar amount in melons, all of which results, except, of course, the apples, are being secured this season by horticulturists in this state. It is for the purpose of showing how these results, and even better ones, can be and are being obtained, that the department is carrying on investigations at the present time. To find out what methods are being followed with success and what with failure, to gather definite and reliable data as to cost of growing and possible profits in fruit production in Indiana, to furnish a basis of comparison as to the relative desirability of various types and methods of fruit-plantation management, to discover the greatest sources of loss and causes of ill-success, so that remedial measures may be suggested, and finally, as an incidental mutual benefit, to bring the horticulturists of the state into closer touch with the work of the station; these are some of the

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general objects we are striving for in our co-operative work. The investigations which are in progress now along these lines are preliminary in their scope and intention, and while the information we are gathering will be of considerable value in itself, the aim is simply to use the information thus derived as a basis for definite experimental work, later looking to the solution of some of the problems which are already cropping up. The department has about sixty-five orchards under observation this season, varying from two to one hundred acres in area and distributed through fifty-five counties, ranging from the Ohio river to South Bend, and from Greencastle to Cambridge City. The points noted cover acreage, varieties, age, management, cultivation, spraying, pruning, cost of production and prices received.

In addition to the orchard work a line of experiments is being carried on in the melon growing regions of the southern part of the state. For many years the melon louse and the wilt disease or blight have wrought havoc, and annually caused the loss of hundreds of acres of melons. Of late years the attacks have been unusually severe. These troubles are being investigated. The action of the wilt is being studied in about fifty fields. In co-operation with the growers, spraying experiments are being carried on against the louse in four localities, the sprayed area covering in the neighborhood of fifty acres. An encouraging feature of this work is the enthusiasm with which the advances of the department are received and the active interest and spirit of co-operation shown by the melon growers. In one locality the growers have contributed money and hired a man for the entire season to work under the direction of the department such time as may be desired.

So much, then, for the plans and work of the department for this season. To tell all we have in mind would take much longer. The question of sub-stations is one of importance. In many places these are provided for either sole horticultural use or for several lines of station work, since as a rule it is recognized that the State Experiment Station is in better position to obtain the best results for the people than any other organization. At these sub-stations, under the charge of trained men, devoting their whole time to the work, in closest co-operation with and under the direction of the Station Department, the problems peculiar to the locality in which they are located can be much more advantageously studied than in any other way. Long time experiments running through a series of years can be carried on many times, which could not be carried on at the station grounds owing to unfavorable location, and which cannot be carried on co-operatively owing to frequent changes in policy of management of private orchards. The adaptabilities of the region to the successful growing of fruit can be demonstrated, to the benefit of the surrounding counties. In

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this way these sub-stations may be made of the greatest educational value in regard to varieties, methods of management, etc. To any one at all familiar with the work possible to be done at sub-stations, and which can frequently be done more advantageously than at the station grounds, it is unnecessary to discourse on their merits. In experimental work much more dependable results can be secured by them than in co-operation with individual growers, for at sub-stations all possible factors can be controlled. Unfortunately, when working with individuals such is not always the case, since what may be called the personal equation is often large and indefinite. It is in comparatively rare instances that the time, the man and the place meet in such happy conjunction in co-operative work that results of the greatest accuracy can be secured. Not every one is willing to do the necessary work at the right time, and the instances of sufficient interest being developed to cause individual growers to hire men at cash outlay to do co-operative work are so rare as almost to be unique.

The greatest drawback in the way of the development and prosecution of the plans of the department is lack of money. In other lines of work the people of the state have not shown themselves indifferent to the needs of the station. Through concerted legislative action the State Dairymen's Association and the Live Stock Breeders' Association secured the appropriation of a fund of $25,000 to allow of further experimental work along lines which they foresaw would be to their own advantage. This the horticulturists have not done. No such fund has been provided by the horticultural interests of the state for experimental work along lines of especial interest and value to them.

I believe it would be of the greatest usefulness to the fruit growers of the state for the department to secure control by long time lease or purchase of orchards or tracts of land suitable for other sorts of fruit production, in various parts of the state, and to administer these tracts according to their peculiar needs and possibilities and in accordance with the latest special knowledge. Such places would serve as points of the greatest educational interest and as demonstrations of what could be done. Work of the sort above outlined you may call properly experimental or demonstrational, according to the way you individually prefer to define the term. It is, however, doubtless in the kind of demonstration work, such as spraying in an orchard, that the society and the department can work together with the greatest efficiency. It scarcely need be said that in order for each to be of greatest use to the fruit growing interests of the state, and by so doing for each to fulfill the fundamental purpose of its being, that there should be a complete understanding and harmony of policy between the Horticultural Department and the Horticultural Society wherever their work may touch. Each has his own place to fill—the field is large, the

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harvest is ripe. All needless duplication of work should be avoided. At the same time provision should be made for close co- operation whenever the nature of the enterprise to be undertaken may allow of it.

In our consideration of demonstration work we should not lose sight of the permanent exhibit at the station grounds. Here we have growing 100 varieties of strawberries, which are seriously cramped for space, apples, pears, plums, peaches, cherries, grapes and small fruits. The greatest crowding is felt in regard to adequate space for the study of small fruits. The remedy for this condition I have already pointed out.

What may be called the demonstration work outside the station grounds has heretofore received but little attention from the department, because previous to the present time, on account of lack of men and equipment, the department has been unable to prosecute it. There is a splendid field for this work, however, and the department is ready to take it up. If it meets with your approval the department would be glad to co-operate with the society in this matter and submit a plan to a committee from the society in regard to demonstration work in spraying, to be carried on jointly by the Horticultural Department and the Horticultural Society during the coming fall and spring, or at any time that, upon due consideration, might seem to be best. Such work might embrace not only demonstrations and instruction in spraying for the different orchard pests, but also the making of spray materials, lectures upon the *why* as well as the *how*, upon selection of varieties, laying out, care and management of fruit plantations of different kinds, pruning, cultivating, harvesting, etc. It would doubtless be wise, in view of the present conditions in the state to devote especial attention to the San Jose scale and methods for its control.

There is only one other point to which I wish to call your attention before I close, that is to the Farmers' Short Course annually held at Purdue under the auspices of the Experiment Station. Formerly this gathering was known as the Corn School, but last year the scope was widened and instruction is now given in Horticulture, Animal Husbandry, and Household Economics, as well as in corn judging. Here is simply another hitherto unused opportunity for the society and the department to co-operate in furthering the horticultural interests of the state. Many of the members of the society, perhaps the majority, do not find their sole agricultural interests and their sole profit in the growing of fruit. It is probable that other features than the horticultural in the course would be of interest to many members of the society. On the other hand, there are many who attend these meetings who, although not actively identified with the work of the society, ought to be, and are interested to some degree in the production of better fruit, if only in connection with their own home orchards. The development of the home orchard is something that we cannot afford

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in our work to overlook, since it is out of the beginnings here made and from the experience here gained, that the ranks of those interested in commercial horticulture are recruited. It would seem to me true, that since the attendance of farmers at these meetings, averaging about 1,000, three-fourths of whom it is fair to assume are interested in some degree in the production of better fruit, is about three times as great as the attendance at our winter meetings, that the society would do well to consider the matter of annual exhibitions to take place at this time, as well as at the State Fair and the regular horticultural meeting. Here horticulture is placed side by side with corn and live stock, and there is no reason why we cannot see that our especial interests are adequately represented. Last year a small beginning was made. One table of apples was exhibited. At hardly any time during the day was there standing room within three feet of it. Why cannot the department and the society work together in this matter and show that fruit is grown in Indiana?

I shall be glad at any time to talk over, individually, with any of the members of the society any of the plans here discussed. In conclusion, then, bearing in mind what the department is doing, and giving attention to what it desires to do in the immediate future, if there are any phases of the department's activity presented or proposed in my remarks that seem worth while to the members of the society, let me suggest that it is up to them to make an effort to see that their especial lines of work receive adequate encouragement from the state.

President Swaim—This is indeed a very excellent paper, and if there is anyone who has anything to add or any questions to ask we will devote a few minutes' time for that.

Prof. Troop—I wish that this paper might be discussel, because we would like to know what the members of the Horticultural Society think of the suggestions made by Prof. Woodbury. We have realized for a long time that the horticultural department of this institution was not doing enough along experimental lines in this state, and the reason, of course, is very obvious to those who understand the conditions as they have existed. As has been suggested by Prof. Woodbury, for more than twenty years I have been alone in this department, but now Mr. Woodbury has come with us and I have turned over to him very largely the experimental side, especially outside of the university, and he has given us some of the things we have in mind. Now I wish that the members of the society here might express themselves along this line, so that we can see how it strikes them.

Mr. Ritterskamp—I will say that already in our section there has been quite a change brought about by what the department has done. We had quite a bit of trouble in growing cantaloupes, for just as we thought we

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would have a good crop they would be destroyed, and this year there is a decrease in the acreage of five or six hundred acres. Last year we had trouble. We now feel that with the help of the station we will overcome most of our difficulties. Recently, when we had our crop almost in hand—about two weeks before they should ripen—our hopes would be blighted. Sometimes it would be on account of weather conditions, for which, perhaps, little can be done, and sometimes it was on account of diseases and insects, which we believe with proper assistance we can remedy, and I can say that the people are hopeful, with the assistance of the station, to overcome some of these difficulties.

President Swaim—There has been a question in my mind for a great many years about the work that could be done in aid of horticultural interests by a close, co-operative working between the Horticultural Society and the Experiment Station, and I believe that Mr. Woodbury is on the right line. Too many people are trying to grow fruit, that are careless. They do not really understand the care necessary to succeed, and I believe by a systematic co-operation in this work a great deal of good may be done. If the station will carry out their part of the programme I think the Horticultural Society will do its part.

Mr. Snodgrass—I wish to say that I do not see any reason why there should not be a closer co-operation between these departments. I think there is another reason why we ought to co-operate, and that is for the enthusiasm it gives the work. If the people are not enthusiastic the care of the fruit orchard is usually neglected by reason of the other work on the farm, for in the spring and summer, when pruning and spraying is necessary, there are very many other things to take our time, and we are more likely to do the work in the orchard if we are led to see, in a forceful way, its desirability. A great many farmers and fruit growers know more than they practice and they simply do not have confidence in themselves to do the work. I think demonstration work is a great help to the farmers. They may have read in a paper what should be done, but if they have never seen it done they are fearful and do not have confidence enough in it to attempt it. It is the demonstration work among fruit growers that encourages them and enthuses them to action, and if we will co-operate with this department I believe that it would be of great good, and for one I am heartily in favor of it.

Mr. Zion—I would do anything within my power to make fruit growing successful in our state and to upbuild it, and I have always in my heart good wishes for, and I desire to co-operate with the department and with the university, and I hope that in the future this will be done. I hope that the department will heartily join in with the fruit growers of the

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State of Indiana, and that the fruit growers will co-operate with the university. Our state has many fruit growers, and we are not theoretical, but practical fruit growers, and we ought to work in harmony.

I lived in California fifteen years and saw the absurdity of trying to control insect pests and plant diseases under laws similar to those which are in force now in this state, but fruit growers of California very wisely had their laws changed and are now operating under a law similar to the one which I had introduced into our legislature and one which we must have before we can accomplish anything along this line, and I was sorry that Purdue Experiment Station and the Horticultural Society opposed that bill.

I would like to have co-operation with Purdue University in this fight against the scale. If this is not the correct bill, let's get one.

President Swaim—I believe you are a little off of the subject, Mr. Zion, and I think we had better defer a discussion of the scale until the time when it comes up in general session. That will be the proper time for this discussion.

Mr. Zion—I think a good time is any time, for you were talking about co-operating with Purdue, and that is what I would like to do.

President Swaim—We are going beyond limits.

Mr. Milhous—I am heartily in favor of this society co-operating with Purdue University, and I do not believe that we can get along without each other, and I think it should be impressed upon the members that we are obliged to work together. I want to feel that Purdue is my friend, and I am going to take the liberty to call Purdue University when I get into trouble and need help. We need to use Purdue, for we cannot do without it. Neither can they do without the Horticultural people.

President Swaim—Mr. Milhous has the right spirit. I think we will have to drop this subject now. It is very warm this afternoon and we do not want to stay any longer than it is necessary, so we will hear the next paper, "The Local Horticultural Society and What It Should Do," by Mrs. A. H. Bogue, of Lagrange, Indiana. I understand that Mrs. L. E. Deal has written and will read this paper.

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THE LOCAL HORTICULTURAL SOCIETY AND WHAT IT SHOULD DO.

BY MRS. L. E. DEAL, LAGRANGE, IND.

How can we best advance the interests of our society? What are the interests of our society? What was the purpose of its organization? are some of the questions which come to my mind. Whatever benefits our society benefits its members; so they in turn are the more able to return it to the society. The object of our organization was a three-fold one in my opinion, viz.: the promotion of agriculture, horticulture, and last, but not least, our social interests. Along the line of agriculture much is to be gained by mingling together, exchanging ideas, giving actual experiences, not theories; profiting by other people's failures and successes. A good live, foreign speaker, whose own locality has a similar soil and climate, is beneficial in some ways. If his ideas are not applicable to our own business it is a satisfaction to know what other people are doing in other parts of our land. The more knowledge gained, the more satisfaction and enjoyment in living. The time has come when it is necessary to success and happiness to be well informed. We cannot sit down and be content with the happiness of our own fireside; that would be too small, and we are going at too rapid a pace to be satisfied with so small a sphere. We must educate. But we cannot go to school six hours of the day. No. But some days we are in school fifteen hours, the school of hard knocks, and if our thoughts and attention are properly directed much improvement may be made and thus success attained. Times are changing, the country is growing older, the soil is wearing out when not properly fertilized and competition is greater as a consequence. If we would have our boys successful agriculturists we must fit them for that vocation. The time has gone when the boy who does not know enough to do anything else, may make a success at farming. They should have some special training. They should know more about the soil, its composition, its needs and how to supply them. Intensive rather than extensive farming should be their theme. The education of the farmer boys and girls should not stop here. Give them a good literary training; also cultivate their musical talent, if they possess any. Prepare them that they may dignify any labor they are called to perform. The children of towns and cities have this training, why not ours? Break down the barriers between them, that the children of rural homes may have the happy assurance that they are their equals without regard to their vocation. Second, horticulture, though often sadly neglected on the farm, is a great benefit to the farmer. We often hear the remark made, "that a good garden is half our living." Well, then the berry patch and orchard must be the other half. It is the privilege of the farmers to be the best fed of the land. Everything that can be obtained in

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vegetable line in the city market, may be grown in his own little garden. They do not have to lay around in crates in the market, but can be gathered as used, perfectly fresh. A small garden well cultivated will give better results than a large one with less care. We cannot attach too much value to the orchard and berry patch. The apple, of all the large fruits, is of most use to mankind. It is a fruit that is always with us, owing to the large number of varieties, the different times of maturing and their keeping qualities. While the apple fills the largest, the smaller fruits should not be neglected. The strawberry, the easiest to produce of all berries, should be seen on every farmer's table. There is nothing more tempting, more appetizing than a nice dish of fresh strawberries. Our strawberry patch, although not an ideal one, has given us fresh fruit three times a day for four weeks. We have received so much in return for a small amount of labor that I would urge everyone who has a small piece of ground for cultivation to set some strawberry plants. A great deal of labor in canning could be saved if more attention was given to our fruit gardens, thus increasing the season of fresh fruit from June to October. Plant large numbers of peach trees of different varieties and keep resetting, as the peach tree is of short life.

As yet nothing has been said about the flower. It has a great place with us. How much more are we blest than our city brethren, where space is too valuable for cultivation of flowers. There is nothing more beautifying to a well-kept lawn than flowers blooming at different times of the season, each in its turn. There is much satisfaction in the cut flowers for the table and sick room, which can be provided with little cost and small amount of labor. The farmer and his wife are not living up to their privileges as tillers of the soil. As a result much discontent is prevalent in rural life.

The social side need not be discussed to any length, as we all can see at a glance the benefits derived therefrom. The world is full of lovely people. To associate with them is to be benefited. There are many tasks to be performed each day and we become careless about the development of our social natures. The horticultural meeting is a means by which we are drawn together from different parts of the country, thus meeting many whom we otherwise would not know. In closing, there are a few suggestions bearing directly on the benefits of the society. First is time. In order that we may get the greatest good out of our association, be on time in the morning. Devise some means by which the dinner may be served quickly. Each one on program respond readily, all preparations having been made previously. Each member going to be benefited and feeling that the success of the society depends on him.

Secretary Flick—I like the paper very much and I like its idea of what

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a local society should do, but we will be indebted to someone who can give us a scheme by which we can get these local societies. We have but about seven or eight in the state and every county should have one. Marion County has had one for—I don't know hoy many years—possibly Mr. Johnson could tell you—and I do not see how any county can get along without such an association. I believe that those who are not taking alvantage of these county associations are losing more than they know. Now I should like to have some one tell us just how to go about getting each of the counties in the state to have an association like that of Noble County.

While I am on my feet, Mr. Chairman, I want to commend, from my standpoint, the plans and schemes of organization set forth in Mr. Woodbury's paper for co-operation of this society and Purdue University. It is certainly broad enough and fair enough for all.

Chairman Swaim—Has anyone else any remarks to make? I think that you can see the value of the local organizations every time you see them in evidence. They cause enthusiasm, for the neighbors are gathered together and exchange ideas and they are of mutual benefit, and then, too, they are good in a social way, and taken all together they are of great value to all of the members. You will find that it increases the production of fruit, and you will find that as the society increases there is a still greater increase in the success of fruit growing. I think that this society should endorse it in every way possible. It is good for truck growers as well as fruit growers, and we should make the foundation broad enough so that it will attract members from all of the agricultural lines, and then it will be of a great deal of benefit.

The next number on the programme is "Culture of Lagrange County," by Mrs. L. F. Furguson, of White Pigeon, Michigan.

THE CULTURE OF LAGRANGE COUNTY.

BY MRS. L. F. FURGUSON, WHITE PIGEON, MICH.

You have doubtless all of you heard of the good Quaker gentleman who remarked to his excellent wife: "All of the world is queer, Martha, except thee and me; and—and—sometimes I think thee is a little queer." Also you have heard of the crow with her proverbial "own blackest crows," which goes to show that what we are, and what we have, seems to be about all right in our own eyes, sounding like blowing our own horn. But in spite of this we want to assure you, friends, that this subject is all right, as we hope to be able to convince you in the next ten minutes.

Please notice how elastic it is, for the word "culture" has a sort of twofold meaning. It means preparing or fitting for cultivation; and also the result of cultivation, the degree of enlightenment and refinement ac-

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quired by training. The first refers to reducing, refining and rendering productive soil, and all of its products, people and their attainments, mental and physical, which reaches everything that tends to an ever-increasing civilization. So you see there can be no dearth of thoughts along this line.

While we are thinking about it, the whole State of Indiana would be a most engrossing theme to talk and think on, and the airing of her glorious possibilities and acquirements would do us all good, help us to "count our marcies," as the darky said; but we will be satisfied with the reach and scope of our own county for this time, even though, since we have seen your fine country here, and your beautiful city and your wonderful educational institution here, we realize how much you have to boast of. I am telling you nothing new when I say that Lagrange County is one in the northern tier of Indiana's counties, with the Michigan state line for its northern boundary.

So you see it is far enough south to be saved somewhat from these rigors which Medicine Hat and Manitoba know so well how to send down to the states in winter; still, it is far enough north to be controlled by the weather conditions of the big lake region, and thus ameliorate the heat in summer, and giving us usually very favorable crop and fruit conditions. Our county is twenty-four miles wide by sixteen and one-quarter from north to south, with every kind of good soil formed from the glacial drift.

Drawn here continually by its general attractiveness it used to be the favorite camping ground of the red man, as is attested by the numerous camping sites, flint heads, axes, spears, etc., which are frequently coming to the surface in plowing, and the Indian mounds, which are rarer.

The white man lusted for the good things which the Indian possessed, and soon succeeded in driving him away. The white man settled, cleared and reared homes according to legal requirements on these beautiful lands.

Concentrating history (which is apt to be tedious) to a point, this settling process went on till every foot of land was legitimately owned and cared for.

Families, schools, churches, manufactories, official buildings, villages and towns were reared and constantly increasing demands have been met, until—behold the resultant effects of plenty and prosperity of the present time. Would you like to know what some of these are. We may not give them in the order of importance; some of you men would, but you will catch our meaning. First—While these broad, beautiful fields have been cleared for cultivation, yet much of the original growth of timber is still standing, and you can judge how valuable they are today, as they are white oak, whitewood. walnut, hickory, beech, maple, all good varieties of hard wood, fit for any kind of building, furniture, implements, etc. Second—

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Nature has furnished an unlimited supply of the purest water in the world, running through underground channels and into pockets, to furnish us this "nectar of the gods" freely, wherever we decide to set up a home. Also our county is threaded by many clear and constant rivers and streams, chief of which is the White Pigeon river, which flows through a goodly portion of the county into the St. Joe, in Michigan, and thus enters Lake Michigan. Thirty-five beautiful lakes lend their charm to our county. You are aware how renowned are the lakes of northern Indiana and southern Michigan today and what an influence they have in the financial, social and material world.

In these easy times of full dinner pails and everybody for a vacation, you know these lakes must be reached by the masses. Time was when the upper crusts, the "four hundred," had an almost exclusive right to the places of amusement, but now, why, we are all coming to it.

The "summer girl" crops out from every rank in life; older women thus try to keep a grasp on their youth; rich man and poor man, minister and dentist and doctor—yea, and undertaker—all must have their vacation and it is at these sheltered, yet attractive, lakes of northern Indiana and southern Michigan that these people love to congregate.

The question of how they shall reach them has been met in two ways. Trolley lines have been and are being run from town to town along a thickly populated route, out to these resorts, which have been supplied with every need and device for entertainment to suit every taste. Then, too, our Lagrange county townspeople and many, many farmers, are forehanded enough to own their own automobiles, thus enabling them to do their own touring, regardless of railroads or trolleys. So much for the recreation part—only a few days or weeks in the summer at best—and it only proves that our people are learning just how to live and that "all work and no play makes Jack a dull boy." But as our people, in common with the rest of humanity, usually live fifty-two weeks in the year, we must tell you what is done to provide for the demands of al the other weeks.

Our naturally fertile soils are reinforced annually by their enterprising owners, and with the excellent crop conditions which have prevailed for several years, neither disastrous winters nor summers, neither drouth nor deluge, we are raising immense crops of hay, wheat, rye, oats, corn, potatoes, and as a consequence, of hogs, sheep, cattle and horses, and you know very well at what pleasing prices we have been able to dispose of these lately. Every variety of fruit that will stand our climate has been coaxed into its best in our orchards and more than one medal for the best apples, pears, peaches, plums, etc., has found its way from a World's Fair to cheer our farmer's heart and to encourage him to further effort.

The magnanimous telephone organizer hasn't left us out, but town to

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town, neighbor to neighbor, farmer to farmer, is strung along on a good serviceable line, like so many beads on a string, or so many links in a chain. This broadens our horizon and keeps us in touch with the whole wide world. It has another good effect that has an immediate bearing on the general culture of our people. I hardlly know how to tell it to you, but not so much personal visiting goes on since the invasion of the telephone; it is so much easier to step to the 'phone and call up; but as there is so much more restriction placed upon the tongue when conversing over the telephone, the people have been unconsciously disciplined, and the poor, over-used telephone is fast weeding out gossips and their objectionable communications and is promoting good manners. Then, seeing we were doing so much for ourselves, Uncle Sam takes a hand at it also and steps right out clear of all precedent and sends our mail out to us every single day in the year, Sundays and holidays excepted. Bless Uncle Sam! We can now, all of us, have our daily paper and keep abreast of all the grafters, the mine-blowers, the divorces, the black hand and the whole criminal set, that certainly infests some other counties more than our own. You may think this is a doubtful aid to our general culture, but it is all right, for it shows us what not to do.

And just think what our county (and state) has done for its rising generation; its young men and women. Why, our school system is acknowledged to be far in advance of that of almost any other state. What would our grandmothers have thought, if, instead of a two or three miles' trudge through rain, sleet or snow, a fine, covered, cushion-seated hack had driven up to their door every morning, taken the children to school and returned them safely in the afternoon, dry and warm, and all free of cost to them. What would they have thought of our fine schoolhouses, fully equipped for every grade of intelligence and every need for advancement met by competent apparatus and instructors, to say nothing of the finely selected pianos and libraries owned by each and every school in our county.

Not content that the young people alone shall advance, our people have put their heads together and have organized farmers' institutes and a county Horticultural Society, in which any and all questions are freely talked upon and discussed, thus bringing out helpful ideas from the intelligent class, and teaching us how to best meet all demands of life and how to make the most of it for ourselves and others. You will understand more fully why this is so when I tell you that while our county has its full quota of up-to-date, enterprising business men, instructors, smart, truthful lawyers, doctors who treat to cure, public officials who serve the people who put them in, we want to tell you that if you were to travel the State of Indiana over, or the whole country, for that matter, it would hustle you to find a county where the people who live on the farms were any more

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awake, intelligent, refined, cultured, than are they of Lagrange county, Indiana. I heard James Whitcomb Riley say: "The time was when you could tell a farmer's wife or daughter as far as you could see them; but that time is past, for if they know how to manage it right it is no more necessary for them to tote their eggs and butter, etc., to town and go lugging them into stores, but they can sit at home and read till the cream collector and egg man call for what they have and pay them cash, with which they can buy from home or city stores just the same up-to-date clothing as the country village, town or city ladies wear, and at the same time acquire that air of independence, prosperity and grace that always accompanies the well-dressed. They belong to and acceptably take an active part in the women's clubs, thus enabling them to keep abreast mentally; and farmers' women folk are learning how to take the care of themselves physically that will keep them well-preserved and often a delight to look upon, through many years. And the men—the farmers of our locality. We believe you have met enough of them to be able to judge, so we will content ourselves with saying that they are in every way worthy to be the husbands, fathers, brothers and friends of our women. So, with today's program, my friends, in all probability, you have not heard the last from the people of Lagrange county.

And now we want to tell you what kind of homes our people, the majority of them, spend their years in. Large, commodious, well-repaired houses are the rule, luxuriously furnished in refined and artistic taste; modern improvements; very many have a water system, and their houses piped for and supplied with acetylene gas, having their own engine in the basement. In these homes the best of sanitary conditions prevail; the table is constantly spread with snowy linen and what was once a company luxury or extravagance to our grandmothers, but what has become a necessity today, a full silver service for every-day use. The sweetest bread and butter, the freshest of fruit and crispest of vegetables are supplemented by breakfast foods and tropical fruits at the housewife's will. Ice is stored in winter to furnish frozen desserts in hot weather, and fruit and vegetables are put up in summer to keep up the table's reputation in winter. When the work is done the spare moments pass only too quickly amid the papers and dozens of magazines and the large and well-selected library, helped out by the cyclopedias of general information, history, science, literature, art, etc.

And these homes are, as a rule, placed in large, well-kept grounds, tastefully arranged to exclude glaring sunshine, and yet to admit it fully in winter when most needed. Ornamental flowers, shrubs and trees, cement walks, grassy lawns and terraces invite repose and insure peace, for you will remember that the people who inhabit these homes are not only

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the producers of these conditions, but also the result of them. You see we have 15,000 people in our county; we have twenty towns and villages; a genuine Carnegie library on the Haw Patch.

One of the best military schools of America is located in Lima, Lagrange county, in which you will find pupils from Maine to California receiving drill and instruction. The credit for its being so widely known is in a great measure due to Rector McKenzie, who ranks among the most intelligent, efficient and at the same time noble men of our county or state.

Our county is the home of one Indiana poet, Mr. Silas B. McManus, whose writings, through their true and touching descriptions of home and its life and feelings, have won such attention from the world that they have been translated into foreign languages We have two physicians in our county who rank far and away above the average; Dr. Hostetter of Lagrange, who has attained deserved notice throughout the state, and Dr. Hunn of Shipshewana, who is rapidly reaching the same status; each of these doctors has no need to resort to tricks to increase his practice, for each has now sufficient work to keep him the very busiest of professional men.

Two of our men are in the State Legislature. Mr. Ganiard, senator, and Mr. Babcock, representative. And so, my friends, we might talk on and on, but we will only add that while we are well aware that many other counties of Indiana could make a most excellent showing, too, we are not, and do not, wish to appear egotistical, yet we want to leave this thought with you; that Lagrange county has the ear-marks of a "comer."

And if you have any doubts of the truth of all we have been telling you, the only way for you to prove their truth is for you to come and see for yourselves, and this we most cordially invite each one of you to do, for we know that the best ornaments of a home are the friends who frequent it, and we will insure you royal treatment and a fine good time, and we can probably do you more good in that way than we have by reading this paper here today.

President Swaim—I will bear testimony of the hospitality of the people of Lagrange county. I have been there a number of times. This evening we would like to commence our program promptly at 8:00 p. m. Prof. Troop wishes to make some announcements.

Prof. Troop—I should just like to say that we had expected to have different makes of spraying machines tomorrow morning, but we have been disappointed. We were to have a Niagara spraying pump, but just at the last moment we heard from them, saying that they would be unable to make their plans work so that they could have anything here, and

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so we are disappointed. We also expected to have gasoline engines, for this was what we had in mind when we put this in, but we will not have anything except the Wallace sprayer, which is the only power sprayer we will have. Most of you know where the orchard is. We will commence spraying there at 8:00 o'clock unless it rains, and we would like for all of you to be there ready to make suggestions. You will find in the orchard here, which was planted some eighteen or twenty years ago, that most of the fruit is of the Russian variety. About 1885 we had a cold winter that killed some of our orchards through this section, and everybody wanted trees that would be ironclad and wanted to know about the Russian variety and for experiment this was planted. We will talk more about that tomorrow you will see some different ways of pruning; those of you who are of a critical turn of mind will find points to criticize. This orchard is used not only for experimental work, but for instruction work, to show how the work should be done and how it should not be done. And so you will not find everything up-to-date as perhaps you think it should be. But, as President Stone said, we welcome any criticism of our methods that is made in the right spirit. That is what we are here for. If any of you wish to see the buildings here I think most of them will be open after we adjourn here this evening at five, and those of you who have not been here for some time will probably enjoy going through the buildings and seeing the improvements that have been made since you were here last.

President Swaim—I wish to say that we are always ready to take the names of those persons who wish to become members of the Society, and also to take the dues of those who are delinquent for the present year. If there is nothing more to come before the Society at this time we will stand adjourned until 8 o'clock p. m. this evening.

The meeting stood adjourned until 8 p. m.

WEDNESDAY EVENING SESSION.

President Swaim—The hour has passed for the opening of this meeting. We take up the first topic on the program, "The Relation of Farmers' Institutes to the Horticultural Interests of the State," by Prof. W. C. Latta of the Purdue Experiment Station.

Pro. W. C. Lata—I should like to invite all of you to make yourselves as comfortable as possible by getting near the windows. This room is somewhat within the main building and I think it will be pretty warm for you. I am glad to have you make yourselves comfortable, because when you are feeling right it will not be so hard for you to follow the speaker.

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I have come back from a two weeks' meeting, and I feel a little bit tired. I sort of have that feeling of a man that has not been living right for some time, losing sleep, eating too much, etc., and so I am not at my best, and my best is not very good, and so I want you to be as comfortable as possible during this warm evening.

I want to say, in the first, place, that there is no organic relation existing between the farmers' institutes and the horticultural and agricultural and the dairy and domestic science interests of the state. The law under which the farmers' institutes are conducted does specify that there shall be instruction in agriculture, horticulture, chemistry, entomology, and that the meetings shall be conducted so as to give to those attending the highest knowledge in both theory and practice of agriculture and horticulture. That is as far as the law goes; but I say that there is no organic relationship between the farmers' institutes and those other interests of the state or the other associations which have for their special object the promotion of these other interests of the state.

Let me give you what I believe to be a fair definition of the relationship that should hold between the farmers' institutes and the various agricultural interests of the state. It seems that they shall submit to the organization of the work of the farmers' institutes and thus tend to make them more effective. They should seek also to unite the common efforts in behalf of the common good of the agricultural, horticultural, dairy and live stock associations of our state. Now the farmers' institute does not pretend to be a co-ordinating agency. It simply stands ready to co-operate, ready to lend a hand to those other agencies so far as they may desire, or so far as it may be practical. I think that this definition of the relation of the farmers' institute work as it has been carried on is correct, and it helps in promoting, or at least attempts to help in promoting, the horticultural interests. Some years back a number of district horticultural institutes were held under the auspices of the farmers' institute management, and on one occasion at least the farmers' institute management joined with the State Horticultural Society and held a summer meeting. Now the idea which I think we should have in view is that of mutual helpfulness and co-operation—mutual helpfulness and co-operation. That means that several other organizations which stand for and represent certain phases of agriculture should in turn seek to help the farmers' institute, or at least they should help the farmers' institutes to be helpful to them. That is the mutual relationship, that of helpfulness, which ought to be maintained. The farmers' institute work is definitely an educational one; it is a species of extension work, but it is nevertheless educational; not like the school, not like the college, and not like the convention, and yet it is somewhat like the school in that it is in-

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formal in character, inviting questions and answers and joint interest and participation on the part of the speakers and hearers.

Now, in order that this work of the farmers' institute may be as truly valuable, and that means as truly educational as may be, two things are necessary: Speakers who can instruct, and an interested audience. Right in this connection there is an opportunity for co-operation on the part of the horticultural society and the local society and farm club, etc. It devolves on the institute management to provide speakers who shall give instruction on the theory and the practice, and this management has sought to get the best value with the means at our command. But it devolves on this organization, and, in some measure, on the farmers' institute and local dairy associations, etc., to assist in bringing the attention of the public to the work that is being done, not only by this association, but by the farmers' institute work. I feel that on this particular line there might be more effective co-operation than there has been. I was surprised to learn, however, that so few of our counties have local horticultural societies at the present time. I believe, Mr. Flick, you said that there were only six or eight.

Secretary Flick—There are eight horticultural societies; there are a number of farmers' organizations, but only eight purely horticultural societies.

Prof. Latta—I supposed there were more than that. These horticultural societies are co-operating very effectively with the farmers' institute local management, and right here I might digress a moment to speak of the plan and the arrangement for the meetings. You will see what I mean. It is a practice of the general management to send out each spring a blank to the chairman of the farmers' institute with advice to the associate officers of the institute and women's auxiliaries as well, requesting suggestions as to subjects that would be most helpful to the local interests. That is still done and returned to the office of the superintendent. If the horticultural society wants a place on the program they should see the society chairman and make their influence felt in suggesting topics that ought to be discussed at the local farmers' institute association. You can see that there might be a very effective co-operation of these local associations in securing discussions of questions which they believe to be of interest.

The complaint is sometimes made that horticulture does not receive due recognition at the farmers' institutes. Well, I think that is a just complaint; I think that it is true. And yet, who is to blame? If the horticultural people of the community do not bestir themselves and make their wants known and do not make a plea for their needs in the horti-

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cultural line, you can hardly expect that their interests will be particularly looked after; and when I say "their" I mean the interests of the county in which they live, not their personal interests in that particular line. It seems to me that it often happens that there is no request for any discussion at the institutes; it frequently happens that you do not agitate these things. Now, for some time it has been the plan to seek the advice of the local association, and there has been occasion to confer together so as to subserve the needs of the people of the several counties of the state in the subjects suggested for discussion, and the general management provides the best speaker that can be obtained, a practical man in these lines. You will see that the very best results are accomplished through the farmers' institute work in behalf of agriculture, but more work in horticulture can only come about through the earnest effort of the men interested in horticulture, who will let their influence be felt in the councils of the local farmers' institute associations. There should be an opportunity for this kind of co-operation.

Now, in order that co-operation may be effective, there should be a knowledge of the needs in the line of agriculture and horticulture and plans for meeting these needs. It follows from this, then, that the farmers' institute associations should be posted, through its membership, through its roster of officers, as to the needs of the community, and should be posted as to the plans of the general management for the meetings. We have come to recognize a new need in the farmers' institute work. When the work began, something over eighteen years ago, or about eighteen years ago now, the attendance was largely made up of gray-haired men. In many cases, in these earlier meetings, there were no women and no young men, and none, or a very few children. Now things have changed, and now these institutes are composed largely of young men and women who have not yet reached the middle age of life. Now there are as many women as there are men, and the average age has been growing less and less with the years; but the boys and the girls have not yet come to take the part in this work that we would like for them to take. And there is a general recognition of the fact, not only in this state, but in other states, and it was also recognized by the American Association of Instructors. There is a general recognition of the fact that we need at the present time to get hold of the boys and girls. Let me give you the reasons for this. The older men and women have come to have many fixed views and habits in life. Something new may be presented to them and meet their approval, and yet, on account of their age, they are not likely to put it into practice; and if they should, the time is short, because they are beyond the meridian of life. We want to get hold of the boys and girls, because they are still in the formative stage and they have the great bulk

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of life before them; and so there is an increased intelligence and effort on the part of the institute management in the several states to reach and interest a great many of the boys and girls in the lines of work, and when this is secured they will then have a more beneficial effect upon the agriculture of the country. Of course, I used the term "agriculture" generally, including all of the other lines.

A few words now with reference to the plans for getting hold of the boys and girls. Doubtless many of you are aware of the fact that the general assembly passed a new law in relation to the farmers' institutes the past winter. That law makes ample provision for securing funds for meeting the local expenses of the farmers' institutes; that law also specifies that contests of various kinds and competitions on the part of the young people may be legitimately encouraged and the expenses incurred in doing this may be met from the funds which can be raised under this law. The law provides that the county auditor may approve a bill for the contest for one hundred dollars toward the local expenses, if one hundred dollars has been raised in membership dues, and if, also, two hundred dollars has been expended in behalf of the work. The law provides only that the deficit should be taken care of, and if one hundred dollars is raised in dues for meeting this competition in the interest of the young people, and one hundred and fifty dollars has been expended, the county will provide the additional fifty. But the chairman of the society, under the law, secures one dollar from the county for every dollar raised up to one hundred. You see this makes a magnificent fund with which to carry on this institute work.

I met Prof. Hamilton of Ontario the other day—you all know who he is—and he said to me: "Professor Latta, Indiana is a little ahead of any state in the Union in its present provision for the farmers' institute work." This law is a very opportune one in that it comes when every institute worker is turning toward the boys and girls, seeking to interest them in some line of work for their own benefit. The problem at the present time is as to how to get hold of these boys and girls and engage them in this work. It is a big problem. I have said that it will take three years to get into good working condition under this new law. Some counties are not active, some are in line. This (Tippecanoe) county will ask for the full one hundred dollars from the county treasurer for this work, as we expect to meet the conditions. We realize, however, that we need some means to get hold of the boys and girls in our own county; we want to get the fathers and mothers to help us in this. But you will find that they are very poor advertisers. They will not advertise their own business; they will tell you that they don't know how to talk about their business, at least they do not do it. In this county, as well as in some others, we

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have been seeking the aid of the county superintendent of schools as well as of the teachers, and we have already been rewarded with a great deal of success in quite a number of counties, and the contests have been a great incentive for the boys and girls to attend institutes. But you see that I am getting beyond the subject of the "relation," but I want to emphasize the opportunity for the very effective co-operation in these farmers' clubs, the local horticultural and agricultural societies and the dairy associations, in helping to get hold of the boys and girls and enlisting them in these competitions. We have got hold of some of the teachers in our schools, and a great many of them have made an effort to make these contests truly educational and at the same time make them definitely practical. It seems to me, under the joint auspices of the schools and the farmers' institute management, we might have contests that were practical and educational. The school men will see to it that the methods are educational, and the farmers will see that they are practical. This would surely better the lives of the boys and girls and in some way make definite preparation for the future farmers and farmers' wives. You see, therefore, that there is an opportunity for the local societies to come into a very close relationship in this work in behalf of the boys and girls.

Now these contests may be along horticultural lines as well as agricultural or domestic science. So far as I know, Mr. Chairman, there have been as yet no horticultural contests in this county, and so far as I know there is nothing in the way of fruit-growing contests. We have corn contests and butter contests, and bread-making contests, and, as I have said, I do not know of anything in the way of the fruit contest, and the horticultural people ought to come to the front and suggest lines, so that our boys and girls will be interested early in these lines. We have come to believe in this way, and we think that this method will have a good benefit on the schools. You know that the criticism has gone out that the schools lack practicality, and that the high schools are educating the young people away from the farmer and the farm home. That is true, friends, whether consciously or unconsciously, the facts remain the same. The proof of that is shown in the fact that so few of the farmers' girls and boys are seeking training for life on the farm. Not one boy in one hundred is seeking a thorough technical training for agricultural pursuits. There may be several reasons for this. A large measure of the responsibility for this rests at the door of the father and mother, and I do not believe it is consciously—it is unconsciously—and we should recognize the actual situation and try to remedy it. We should remedy this, for it is an unhealthy condition. We want to create a new sentiment which will bring agriculture to its rightful place among the callings of men, which will lead the brightest boys and girls to follow that occupation. To do this

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we will have to amplify the calling of the farmer. This would be a revolution of sentiment, but it would be a most wholesome and beneficial one. We believe in the contests because they appeal to the boys and girls and will be one of the most potent agencies. Think of the contests at the county fair. People like to engage in contests and have liked it clear back through history, and people like to witness them, and we can appeal to the boys and girls by this method. Now we want to co-operate with every father and mother, whether horticulturalist, dairyman, stockman, or what not; we want their co-operation so that we may engage the boys and girls in the line of work which relates to the farm. This can be done and it is being done now. It may not be in your county, but it is in some of our neighboring counties; so watch your laurels, that some other county does not lead the van.

I will not take more of your time, but I shall be pleased to answer any questions if you have any to ask. I have defined the relationship which should exist between the horticultural interests and the farmers' institutes. I may say in closing, however, that the farmers' institute work must be potent, must seek to promote and succeed in promoting these various natural interests as well as in creating a new sentiment in favor of agriculture, and if it fails in that it fails signally of its greatest purpose. That it may not fail and that it may succeed in that we must have the co-operation of all of the fruit men and women who are interested in the future of the agriculture of this country of ours. (Applause.)

President Swaim—Has any one a question to ask Professor Latta at this time? This is a theme in which we are all deeply interested.

Mr. Zion—I am a farmer as well as a fruit grower, and I would like to concur in the assertions the professor has made. Not one out of one hundred of our boys stay in the country and desire an agricultural education. This is a most startling condition—the worst in our country. Just think of Indiana being an agricultural state and her farmers sending ninety-nine per cent to study for a profession! I remember well when Uncle John Purdue founded this institution. He visited my father and talked of the great future of Indiana, the wonderful state it must come to be. The time would come when we would go to the fields like the people of olden times, with bands of music, making a picnic out of it. But we have come to think more of the slavery of it, and there is a question as to what we are going to do in this great agricultural state with these conditions. I am glad that the professor has brought this subject up.

A few weeks ago I was passing through our part of the state with Prof. Stone. He was exalting our part of the country, and said that he had been all over Canada, Mexico and Cuba, and that there was nothing

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like our United States, and especially this state, and he was picturing out a flattering future for this country, and then he wanted to know what I thought of it. I told him that I looked at these things from a practical side. Now, the farmers do not know where to get labor to carry on these farms. The boys and girls are talking about going to universities and colleges and social gatherings; but few of our young men come to Purdue or go to the other institutions or are talking of the education they will get for the farm, and from young ladies reared on the farm you will not hear them talking of coming back to the farm, and it even seems that these young ladies do not want to take up with a young man whose aspirations are to become a farmer. I told Dr. Stone all of these things and told him that there was something wrong, but that I did not know what it was. The future to me is this: Now, in this great agricultural state that we have looked forward to and dreamed of, we will have to depend on foreign labor for farm help. We have a right to expect this, for already the Asiatic laborers have started for this country. The inclination of our farmer today is to make every dollar he can, and this is right, and he will soon learn that trained foreign farm help is profitable. We can divide up our farms into lots of ten acres each and put one of these men on each one of these plots and we can get more money and more net profit off of one of these ten-acre tracts than an American will bring off of forty. The American wants to spread all over the country; he wants to farm a large tract, and it has been clearly demonstrated that these foreigners can take care of a small plot and bring in as much money for us as our American farmers can off of forty acres. That is a sad conclusion. Soon our country will be overrun with these foreigners. We will soon have Danes, Chinese, Japanese, Swedes and all sorts. Now, that is the question, professor, and we are looking to you university people to learn the condition of these things what we are doing, and how we can furnish our farmers with good American-born laborers. What can we do to get high, intelligent labor on our farms? The class of labor that we are going to have is not the class that I enjoy working with. I have looked forward to the time when we would labor with a high class of people, but instead it is the paupers. I do hope that the professor and others will find some way to get the boys and girls to go back to the farms and there establish the highest standards of life among men, but now they seem to be going away from the farm to the city. They are told that everything is nice in the city—high wages, theaters, and everything to make one happy. But sad it is for the boy or girl who comes to the city and tries to find that happiness. But they are young and not to blame, for they have been taught to avoid the "hard life of the farm." We fruit growers should appreciate our calling and amplify it on all suitable oc-

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casions. It is the highest occupation that God ever gave man. When God established the Garden of Eden he started man there as an apple grower. You well know why he didn't continue as such. We must think of these things seriously and try to get our young people interested in the farm.

Mr. Milhous—I think that Prof. Latta has struck the keynote of the subject for every farmer in Indiana, whether agriculturalist or horticulturalist, and I believe that there ought to be co-operation between the farmers' institute work and the horticultural work in the state. I believe that in the institutes we ought to have practical men that know how to talk on horticulture and on agriculture. We need men that can direct about the garden as well as about the farm. You never saw a boy that wanted to leave home when the garden was full of fruits and flowers and vegetables.

The last speaker did not know the cause of the boys leaving the farm. I will tell him. The fathers and mothers of today—I will not excuse any one—frequently say to the children: "I hope you will not have to work like I do," or "like I did when I was young." Now that is not right. The children are not a bit better than their fathers or their grandfathers, and I hope that my children will have to work. I want them to earn their bread. We should not put these thoughts into their heads.

President Swaim—Prof. Latta, isn't it a fact that one difficulty with the horticultural work in the institutes is the lack of competent speakers who will take time to do this work?

Prof. Latta—Mr. Chairman, our efforts have been to place horticultural workers on horticultural topics, exclusive topics, thinking in this way to create a good, healthy sentiment, but the results are not all that should be desired. The demand is for a speaker who can talk along general lines of agriculture, as well. I have in mind a man; if I should mention his name all of you would know him. He is successful in his line, but he wants to discuss horticultural lines exclusively, and when we try to send this man out to speak on his line we get an answer back telling us that they want some fruit, but not fruit exclusively; they tell us they want a speaker who understands and will talk on general farming as well, and on account of the sentiment not being quite right in that locality; but I think we are coming to the point where we can, at some places in the state, and under some conditions, make a specialty. I fear that I am taking too much time, but I want to say this. I recognize what has been said about advertising and promoting certain lines which are applicable to the local conditions but not carried on. Friends, we are encouraged on that point, for there is an evolution of sentiment on that line that is very encouraging. I have attended some eight or ten meetings.

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and in every one the consuming topic is industrial training and domestic science, and the contests which have been given, give object lessons in this line of training, and I believe that we will open the eyes of many school teachers to the real value of bringing into the school work the life of the child, and if the results are good we will have a movement in our schools which will tend toward bringing things all right. You know that our schools are a mighty factor in this country. Now there are in them children of Poles, and Danes, and Italians, and Greeks, and Germans, and Irishmen, and Englishmen, who are learning to be Americans. It is a wonderful thing that they are doing. But we want to improve them a little along industrial lines, and we believe that these contests will set a pace, and they will take it up, and we want to co-operate in our homes and in the local associations, for there is a loud call for work in this line where there is so much needed.

President Swaim—This is a very interesting topic, and if we had the time we could spend much more time profitably upon it. But we have another topic, but I am not sure as to whether or not our speaker is here. Does any one know if Prof. Whitten is in the room? He hadn't come at supper time, and I presume he is not here.

Secretary Flick—I have received no word from him excusing his absence. Perhaps I will later.

President Swaim—We have some visitors here with us this evening to whom we extend a hearty welcome, and we would like to have a word from some of them before we adjourn. Prof. Green from Ohio is with us, we are pleased to announce, and we would like very much to have a word from him.

Prof. Green—I had no thought of talking tonight. I thought that I might say a few words tomorrow, when the spraying topic came up, but I fear I cannot add much on what you are saying tonight. If there is anything that I would like to speak on at this time it is on this line of co-operation which has been talked of here tonight. We have been trying in Ohio very much the same plan that has been represented or presented here and we feel very much encouraged, and think we are going to get a good deal out of the work. We find that there is a great field there in which the station could do more work even than we are now doing at the station proper. There is no use, really, in doing experimental work, really no use, unless you get it before the people. If the work is done and dropped and never thought of again, it might just as well not have been done. It may be taken up some place else in years to come, but we want to see the results at once, and the only way to do this is to go out among the people and

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carry on this co-operative work. It may be illustrative, or experimental, or both, but we have had such very gratifying results in our case we feel as though we could establish this outside work, even though we do lose at the station. We find that the more of co-operative work we do the more support we have for the regular experimental work. I might go on and give several cases that I can remember, and I cannot remember all of them, but somewhere the farmers and fruit growers themselves have spoken in very high esteem of the good of the station to them by coming into the orchard and carrying on this experimental work. We do not want to flatter ourselves, but there are two sides to the question. Look at it from my standpoint. I find that it does more good to get out among the people through the state and find out just what the fruit growers want and see what they want from their standpoint and work with them than to stay at the station all of the time. Our horticultural society has always co-operated with the station and they have helped us very materially. They have helped us in telling us what they want done, but as long as we staid at the station they would not tell us anything. Yes, they might criticize us, but when we went to working with them their suggestions came. So, then, I believe that the horticultural society of this state can do itself a great deal of good and the station a great deal of good, by co-operating with the station, and you can do this in various ways; but the best way for the fruit grower to do is to try some line of work that the station wants done and do the best he can, and he will find it will do him a great deal of good; it will benefit him in many ways. He will have to get down to facts and study the meaning of things, and in doing so he will find that he will develop his business to a great extent, and he will find that the station can help him constantly. There are a great many things in the line of experimental work that are not always practical, and fruit growers should see this. A good many take up schemes that are not practical, but after rubbing up against people they soon get this taken out of them. I believe it is the best thing for the young man to be put right out in the field. It does not detract from their work in the station. It takes them away a good deal of the time, but, in fact, it quickens their observations, and they get acquainted with people, and it sharpens their wits so that they can do more good, even though they do not spend as much time at the station.

I can hardly say which it benefits most, the station or the horticulturalist, for it benefits both so much. There is such a mutual relation. So I hope you will push this thing and help the station in every way you can think of.

I believe that there should be co-operation between the states in a great many things, and I know that there could be. I think there could be

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co-operation between Ohio and Indiana, and I believe that the time will come when there will be. In the earlier days there was a great deal of talk about this, but it seems to have been dropped. The more co-operation there is done between the horticultural societies and the stations the more co-operation there will be between the states.

I always like to come to Indiana, and I come whenever I can, because it seems to me you are so much like home. I meet a great many progressive men here and I get a great many ideas from you, and I cannot understand why there should not be a closer relation between Ohio and Indiana. I cannot understand this. Sometimes some of your people from Indiana come over there, but why don't you visit us more often when conditions here and there are so similar, and we could help each other so much? Surely there could be delegates appointed each year back and forth, and I believe it would do us both good, and while I do not wish to boast at all of what we have done in Ohio in the experiment station, I would like very much if each of you, when you come through Ohio, could stop off and see what we are doing there; not that we are doing more than other states, or better, but I am sure that you would be very much interested, and we would certainly try to treat you in such a way that you would feel that you would like to come again, and would feel pleased with your visit.

I thank you.

(Applause.)

Mr. Zion—What progress are you making toward controling the San Jose scale? The conditions there are about the same as we have here in Indiana, and possibly we can get some valuable information from your experiments.

Prof. Green—We feel as though we can handle the scale pretty successfully. I think that the fruit growers are not handling it at all. The scale is spreading all over the state and doing harm in several orchards, and I know places where there is almost nothing done, but the professional fruit growers feel that they can control the scale to all practical purposes. I do not know of any cases where it has been exterminated, but they work on this when they are spraying for other purposes and in this way no extra work is incurred. We think that the apple scab is controlled with us by a lime and sulphur compound, and so I say those who are spraying make it a business and are getting along all right and do not complain; but I do not know what is going to happen in the case of the small orchard, for it looks like the trees will be exterminated unless something radical is done. We have got to have help in some respect, but there is need of a strong public sentiment in order to get things to going as they should.

President Swaim—I think we will be treated to a treat this evening,

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for I see that our old friend Mr. Ragan, of Washington, D. C., is with us, and I hope that we may have a few remarks from him before we adjourn.

(Applause.)

Mr. W. H. Ragan—You are not more surprised than I that I am here, and I came entirely without preparation for any useful work that I might do, but I came more than anything else to encourage you by my presence, and, possibly, something that I may say or do, when the spirit moves me, may help you. I was raised among the Quakers and I usually act when the spirit moves me; but I am certainly very glad to be here.

I found myself in your state. But after being so near it needed considerable effort to bring me here, but I finally arrived. You all know that it has been my constant practice to be present with the horticultural society as often as I can on all occasions possible. I once heard an intelligent governor say that he made it a rule when traveling, especially when he came upon a stranger, to tap him and see what was in him, and sometimes he found a gem, and sometimes he found a person he could get nothing out of. Now, I came here to be tapped, and if you know how to get me started I may rattle off something that would be a little more than nonsense. I may work off a little nonsense, but sometimes intelligent men are said to enjoy that.

President Swaim—Possibly you can give us some more reminiscences.

Mr. Ragan—I think I exhausted my supply at your last meeting. I have been with you from the start, ladies and gentlemen. There are only three others who were present at the original organization of this society, and that was almost fifty years ago, and of course you know that as we grow older we become more and more vain of our earlier achievements. This was the result of a little extra effort on the part of a few of the pioneers to get the Indiana Horticultural Society on its feet, and for a number of years it was merely on its feet; ultimately, it was more than that, and now it is at its best, probably, so far as its widespread influence is concerned. This has been a mutual organization, and it has been working from the beginning on the original lines of promoting a knowledge of horticulture. So far as the results upon the fruit growing interests are or have been concerned, I really feel sometimes that we have not succeeded. Less than ten hours since, while I was in Indianapolis, I went into a hotel to eat my dinner and the proprietor knew me as an old apple grower, and as I stepped in there for luncheon today I had a small package in my hand, and he asked me if I had apples in that, and I said: "No; why don't you ask for oranges?" I could furnish him oranges for less money than apples this year. It is really a fact that I can buy oranges in Indianapolis today cheaper than I can buy Yellow Transparent apples. There is something

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wrong in Indiana, where the best apples that ever grew in America once flourished, when this is the case. I do not know whether to lay it to the scientists or not, but about the time they came along among us failures began, and the more that we talk on the San Jose scale and the other pests the more they bother us, and this year things look startling. I am yet of the opinion that we can triumph, but it is just as has been remarked this evening here, there must be something more than spasmodic efforts to succeed. I have very little faith in present schemes, and I believe that these pests will be with us until nature does something for us, unless some more scientific order of fighting can be devised. I mean by that that I have little faith in the individual fruit grower of small means ever accomplishing very much in the way of final extermination, and I think it is just about as absurd to think about fighting these pests without a complete knowledge and use of the existant apparatus as it is for a physician to succeed in the practice of medicine without a full equipment, or the individual to practice medicine in the home family without a knowledge of the effects of his medicine, etc. I said many years since before this society that I know of no way for the farmer who has only a secondary interest in fruit growing to stop his busy work to attend to the business of spraying or fighting insects with intelligence and success. It is just the same as seeing a farmer practicing medicine in his own family. Therefore, I believe that some effort like we now advocate should be encouraged. Just as in my young days we threshed the wheat out with horses, but now we depend on the man that is fully equipped for this special purpose, to come to our house and thresh the wheat when the time comes, and he then delivers the clean grain to us, and no more can you expect to look after your fruit properly if you haven't the proper equipment and the proper knowledge. The man that makes a business of fruit growing has no trouble. Some people are succeeding, to my personal knowledge, and others to my certain belief in fruit growing. It is a business with them. The neighbors do not succeed because they do not attend to their trees and plants as these men do. This man that can sell his apples for the price of oranges will make lots of money, and he has done this because it is his business and he has attended to it properly and at the right time and has attended to it intelligently, and he can well afford to do it.

I think I have rambled enough now for this occasion.

(Applause.)

Secretary Flick—We do not know why Professor Whitten is not here. There was a clear understanding as to the dates and all of the particulars, and I had a letter from him not long ago, saying that he would be here, and up to this time we have received no further word from him. We have had no reason to think but what he would be present. We fully expected

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him to be here tonight. I am very sorry he is not here, and I wish to make this explanation, so that people will not think he was put on the program simply for a drawing card.

We are very glad that Messrs. Ragan and Green have been with us, for they have helped us out quite a good deal. Prof. Whitten is on the programme again for tomorrow, and perhaps by that time he will be here. I think, perhaps, there has something gone wrong in connection with his cars and he could not get here.

Mr. Forbes—There has been some complaint about the programmes at the farmers' institutes. It is said that there is not enough pertaining to horticulture on them. I have to say that this is the fault of the horticulturalists themselves, for when the program is being completed they are not sufficiently interested themselves in these topics to see that they are put on. What can we do to interest them? It requires time. When it is learned when the committee will meet to make the programme for the institute some one should be there to assist in making it and have the horticultural topics inserted. We want to impress on the people that there are a number of good fruit growers in Indiana who could give very valuable information along different lines of horticulture.

Mrs. Hazelett—I would say that when the Farmers' Institute for Putnam County was held last year at Greencastle, we were very much surprised at the interest that was taken in the discussion of the apple, I believe by Mr. Burton, who started the Experiment orchard. Before the meeting the people did not think that they cared to have a talk on the apple, for too many were interested in raising hogs, cattle, etc., and it was suggested that we wanted the program to suit the majority, but when the talk on apples came and there were apples passed around, they liked it, even though there were not enough to go all around. In our programme this year we are preparing for the first time for contests for the girls and boys; the girls are to make bread and the boys raise corn. All of the young folks are to assist with the music. This makes the young folks interested; they want to come and stay all of the time. They do not want to miss a session.

Mr. Doan—We have tried giving prizes to the boys and girls who have the neatest flower beds, and we think this will make them good farmers and farmers' wives, for we think it is a good point to begin on the boys and girls.

Secretary Flick—I should like to ask Mrs. Hazelett if they have ever offered prizes on horticulture to the children?

Mrs. Hazelett—No. sir, we have not; that seems to be too hard to get at. Suppose a prize is offered and a boy wants to bring fruit. Possibly he had nothing to do with the raising of it, or the spraying or anything, and it would be practically his father's. All the boy would do would be to

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get the apples ready to exhibit. In our bread and butter contests the girl must take care of the milk. She is not required, however, to milk it, although she may, if she likes, but she must do everything else; and then she must tell before the institute just what and how she has done the work, and she must be at the institute every session. And the same way with the baking of the bread and the raising of the corn, and the prize winner must write a paper.

Secretary Flick—It might happen with the apple exhibit by the boys as suggested; also, that the boys would only gather the corn after the father had taken care of it, for the boys are liable to gather corn from the father's field; but if they do, they are trained to judge corn, and I think that is helpful. I think the children might be worked in the line of horticulture to some extent. The girls might look after the flowers and such other things as would be of interest to them. We might have expert judges take hold of the fruit which these young farmers gather and show the boys how to select and judge fruit the same as they do with the corn. This would lead to the question as to whether or not it would be profitable, and so on. I think that Professor Latta has suggested a field that could be made very fruitful and very productive, and would encourage many of our boys and girls to do some work in horticultural and agricultural lines. I think that these contests open one way that we can interest the younger people in horticulture, and to be successful we must get them personally interested, but this should be done without encouraging dishonesty. That is the one criticism on all exhibits, and if that is properly guarded I think much good can be done.

Mr. Milhous—I don't know whether all of you are acquainted with the facts or not, but our legislature, two years ago, passed a law permitting the county council to give to the county commissioners authority to assess a tax on the taxable property of the county, not to exceed one cent on the hundred dollars for county fairs, to encourage horticultural and agricultural pursuits, stock-raising, etc., but nothing is to be used in the speed ring. I went to see the county commissioners in Marion county, and they said that they were perfectly willing to give us something and made an allowance to our society of two hundred dollars, and so our Marion county society proposes to use this two hundred dollars for the purpose of contests for the young people, mainly.

President Swaim—If there is nothing further on this line we will adjourn until morning. Remember that we are to meet at the experimental orchard tomorrow morning at 8 o'clock, and spend a couple of hours there, during which time a spraying demonstration will be given. After this we will repair to this room and proceed with our programme. You may consider yourselves at liberty.

Meeting stood adjourned until Thursday morning.

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THURSDAY MORNING SESSION, 9:30 A. M.

Quite a number of members and other people gathered in the orchard at the station and witnessed spraying by a power sprayer, examined the manner of pruning, cultivation etc. Many of the apple trees were loaded with smooth, fine grown fruit, showing the effect of proper care. In the garden much profitable information was obtained.—[Secretary.]

President Swaim—The time has come for us to begin our work. Any preliminaries?

W. H. Ragan—There is a matter I wish to call attention to at this hour before assembling. I have been grievously pained to hear since arriving here of the death of one of our old-time friends and a charter member of this society, Mr. John C. Teas, of Missouri, the first treasurer of the Indiana Horticultural Society, who died within the last month, as I understand, and I think it proper at this time to arrange for some proper tribute for his services to us as citizens of Indiana to be presented at the regular meeting of this society, and I therefore move that a committee of three be appointed to prepare a proper memorial to the memory of the late John C. Teas, to be presented in the regular form at the annual meeting of our society in December.

Mr. Hobbs—I second the motion.

Voted on and carried.

President Swaim—I suppose the chair is to appoint that committee. I will appoint on that committee: W. H. Ragan (chairman), Sylvester Johnson and Joseph Ratliff, and they will report at the meeting in December.

The first topic on the programme this morning is "What is Thorough Spraying, and How to Do It," by James T. Carver, of Greencastle. We will hear from Mr. Carver.

James W. Carver—Mr. President, Gentlemen and Ladies:

WHAT IS THOROUGH SPRAYING, AND HOW TO DO IT.

BY JAMES W. CARVER, GREENCASTLE, IND.

Why I should have been asked to answer so important a question as this, when there are so many older and more experienced men, both in orchard and laboratory work, has arisen in my own mind.

Forty years ago I planted my first apple tree—a Jefferis—that remains alive today.

I have not spent all the intervening years in orchard culture, but in all

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FOURTEEN-YEAR-OLD GRIMES GOLDEN—YIELD 38¼ BUSHELS PERFECT APPLES—CARVER ORCHARD.

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these years there has not been a time when I did not own a few growing trees.

During the twenty-odd years that I was out trying to get men reconciled to the Owner of the fruit Garden of Eden, next to seeing souls saved, I was and continued to be interested in trees, especially apple trees.

The world is full of strange things that cannot be explained or understood. One of these mysteries is the growing of a tree. Plant an acorn and watch it grow into a great tree. Where does the material come from that enters into its great trunk and branches, and the trunk and branches large enough to fill several large cars?

"If this material all came from the ground it would leave a cavity; but as there is no cavity, it proves but a small portion comes from the soil. The ashes represent about what comes from the earth and the rest must have come from the air and water in the soil. Think of gases and water being formed into wood of a great tree! But a tree may be changed in other ways. Go to Arizona and see great trees that have been changed into agate and other forms of rock, and even in these the year's growth and all wood markings may still be seen, but it is stone, and these stone tress may be millions of years old."

The tree shades us from the sun and shelters from the storm and marks the course of mortal life.

"Lusty youth cuts his initials and deftly carving surrounds them with a heart."

Time runs. The busy years fly by. He cuts a switch, and folks hear him say: ". his hurts me worse than you."

In lean and slippered pantaloon,
He hums an old refrain;
And then, for a final age of all,
From it he cuts a cane.

ORCHARD BLESSING.

This day two hundred years ago,
The wild grapes by the river's side
And tasteless groundnuts trailing low,
The table of the woods supplied.

Unknown the apple's red and gold,
The blushing tints of peach and pear;
The mirror of the river told
No tale of orchards ripe and rare.

Wild as the fruits he scorned to till,
These vales, the idle Indian trod;
Nor knew the glad creative skill,
The joy of him who toils with God.

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O painter of the fruits and flowers!
  We thank thee for thy wise design,
Whereby these human hands of ours
  In Nature's garden work with thine.

Give fools their gold and knaves their power;
  Let fortune's bubbles rise and fall;
Who sows a seed, or trains a flower,
  Or plants a tree, is more than all.

For he who blesses most is blest,
  And God and man shall own his worth,
Who toils to leave as his bequest
  An added beauty to the earth.

—Whittier.

WHEN IT IS TIME TO SPRAY.

When time comes, do it today, and you can smile over it tomorrow.

To help spraying, "keep your trees rid of bores; also your sitting-room."

To help out spraying, let every orchard man remember, and remember by chalking on his barn door:

"Nuthin' put on the land gives nuthin'."

There are a lot of fools in the world besides those that are engaged at the king's court; and some of them own orchards and can tell you how to spray—with various results; also how many rocks, pounds of manure and different kinds of soil to get from the woods when setting a tree; and often having done this, and, perhaps, if really a leader at farmers' institutes, he will add a few years of good care, then, seed down, rest from his labors, expecting a bountiful harvest. But the experience of twenty-five years shows that these great expectations have been met with disappointment, and a lot of gnarly fruit.

If seeded down to clover, plow the orchard once at least in three years. Don't take every man's word, but study it out for yourself: How to prune, to let in sunshine and air, to drive away bacterial diseases and fungi and other enemies; all these must be studied and practiced, or even the best spraying will bring no results. The way of things is very difficult.

Until two hundred years ago farmers had an idea that plowing was to get enough loose soil to cover his seed so it might germinate. Many today only plow to keep weeds from choking out the crop.

History, theory and practice do not always work together. Twenty crops of wheat will remove less nitrogen, less phosphoric acid and three times less of potash than twenty crops of apples, yet a good farmer would hardly think of growing twenty successive crops of wheat without returning something to the soil.

Yet men get a notion: Now I have a good bloom, I will spray, and

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may do a fair job, but from lack of vitality in trees results are poor and he draws a conclusion it don't pay to spray. "Get this notion: trees exhaust the soil."

Here is another man who has an uncivilized orchard, or perhaps, a semi-savage (by these I mean an untrimmed or half-trimmed tree—perhaps trimmed by sheep, cows and horses). Forgets that God put Adam in his fruit garden, and for the purpose of dressing and keeping it. Dressing and keeping it means planting properly, trimming and fertilizing right and then spraying right, and that reminds me that was what I was to tell you about.

Find out what to spray for! You say bugs and worms. Well, all right. Did you ever look to see when the codling worm mother makes her appearance? For seven springs I have not failed to find her before the apples bloomed in Putnam county, yet I had learned it did no good to use poisons before the bloom. But when you have got her, better kill her then. So, as I am the one to tell you, I say: Put paris green in your sprays before bloom. Next, you say for these lopsided, black and brown specked apples we get, use Bordeaux mixture, which is all right—if thoroughly done, but often we fail partially—there are still some scabby apples. Well, the cause of this, or rather the results are fungi and bacterial diseases, you mostly find on the underside of limbs and the trunks of trees, and if you want to cauterize these and check their growth, use about 4 lbs. of blue vitriol, and 5 to 6 lbs. of lime, and for worms, ¼ to 1-3 lbs. of paris green to 40 to 50 gallons of rain water, and get under the tree and spray upwards. I have found rain water best, and I think I have found that by melting the vitriol in boiling water and slacking lime with boiling water gives best results, yet I have not always practiced it. I have experimented on some trees with 16 lbs. of vitriol, 16 lbs. lime, ½ lb. of paris green, to 50 gallons of water. I have tried part of tree, and left part.

I have left trees untrimmed. (I got my 20-acre orchard six years ago, in March, uncivilized, and weeds 10 feet high.) After putting in paris green never let the agitator stop. If you want to reach all discolored places on the wood (they being mostly on the under side) you had better not do all your work up on a high tower on top of tank, but take a twelve-foot bamboo pole and fasten on a 40 or 50-foot hose, and attach a 12 or 14-year-old boy just behind the pole, say 8 or 10 feet, and go clear around your tree; spray trunk, limbs and all, and also just remember that all the blossoms are not pointing to the sky. I don't care if you get the tree pretty wet; if possible don't leave it dry. I will take 3 to 8 gallons of water to spray a tree, that way, in full leaf.

Now, in this way I have raised good apples. I have found that a Grimes tree can do with less than a Ben; an Indian less still; but even this dip

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will not make a Stark or a Clayton good with me. And to get rid of cutting them down, I have sold five acres of my orchard at $150 per acre, and fifteen other acres at $50 per acre. We have had no occasion to spray for the Chinese scale yet (the government wants to get away from the name San Jose scale, let us help), but I have no fear that the method I suggest for Bordeaux mixture would hold them in check by using lime, sulphur and salt. Don't forget to dilute the bluestone and lime in 10 or 12 gallons of water each before pouring together—no more, no less, water. When sufficiently stirred put in the remaining water. Why do you not use arsenate of lead? Simply for this reason: I cannot safely use it in Bordeaux mixture, as frequently a chemical change takes place which renders the spray worthless; and in the hands of an ordinary person the only safe way to use arsenate of lead is as a spray by itself. You who are using arsenate of lead experiment, see if I am not right. And a further reason: It costs more to charge 50 gallons than it does with paris green. The most important spraying is when blossoms fall. Commence when ground is covered with petals and you will have better and more apples where you commence than where you finish the job. Get your help as cheap as you can, but do not hesitate to pay five or ten dollars a day for help to spray, for every day the sprayer stands idle now will cost you from $100 to $300.

If it rains put in a little more time and spray between showers; if it gets too muddy, put on another team and go ahead. Don't go fishing, for the bugs are biting 1,000 times as fast as the fish.

Friends, as I came up here I looked out of the car window and saw many a wretched orchard, and I could almost hear them crying out, telling their woes and their wants—neglect and suffering, and the very stones answered in sympathy. Poor, miserable, starving trees! They truly looked a race of dying outcasts.

Adopt the best rules you can, work them out as nearly as you can, and you will come short of perfection. But the Master will say, as He said to David: "Thou didst well in that it was in thine heart."

And when failure comes:

COME UP SMILING.

Smile and the world smiles with you.
"Knock" and you knock alone;
For the cheerful grin
Will let you in
Where the kicker is never known.

Growl and the way looks dreary,
Laugh and the path is bright,
For a welcome smile
Brings sunshine while
A frown shuts out the light.

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Hustle and fortune awaits you,
Shirk and defeat is sure,
For there's no chance
Of deliverance
For the chap who can't endure.

The matter of spraying is an important one, and I have tried to study it out along my own lines, to see what the reason was for a great deal of failure, and for having perfect apples sometimes only. I have tried various kinds of mixtures, of different strengths, for different purposes, and at the present time we are using the Wallace sprayer, which has twice the power that we had on the one this morning in the Experimental Station. For ordinary spraying the one we had this morning will do, but for thorough work I am afraid it would not continue the power long enough for the large trees, and I have found it so. I have found that sometimes I have to leave the tree before it is entirely done. Now I have known some people to wait until the wind got right, and I have done this some two or three times myself, in order to come in from the other side, but I have made up my mind that we will go clear around the tree and complete the work while at it.

We have about twenty acres of orchard that was bought from Mr. Hobbs, and I have some pictures here which I would like to show you. After this picture was taken we gathered that day 201 barrels and packed and shipped them in the cars. Last year I got $1.30 for Ben Davis, including the barrel, and $2 for the Grimes Golden, including the barrel, and netted $2,253, and yet it was not all perfect, but we did the best we could.

Another thing I have here. You see this line (showing portion of a limb) here on the underside; you see these rough places, and perfectly smooth on the upper side. These rough places in cold weather, as the temperature varied, continued to rot and to drop down a liquid and these dropping set up a disease and you can not possibly reach it from top spraying; so, therefore, I made up my mind to spray from underneath and thereby get my orchard into a civilized condition. It was nine years old and had never had a knife put to it, and I tried a great many different kinds of trimmings. Here you see a line across here where it had been cut off. At one time it looked as if it would not heal at all, but now it is entirely healed up and covered over. Here is one cut when the thermometer was 26 below zero. I prefer to cut a little bit in the shoulder; that is the way I did most of this cutting, but then I believe in cutting in different ways, to suit conditions, for I think that is the best way.

Prof. Ragan—Some of the older gentlemen were present when the present State Constitution took effect, and it changed the order of things. Among other changes that came about was that the legislator's term in the

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senate was changed to four years. Now, of course, under this new law, one of the senators who was elected would only hold two years and the other one would hold over, and it was decided that they were to draw to see who should have the long term. Now the brother that happened to be successful in getting the long term down in Putnam County realized that it was easier to get it in this manner than to stand an election, and when he found his fate he said, "Hurrah for old Putnam." I love old Putnam County, and I am glad to hear this man talk as he does this morning. I probably ought to say, however, that I have not seen Brother Carver's place, for since he has been operating I have been out of the state most of the time, but I have the best of evidence that what he has said this morning is true.

Mr. Hazelett—Mr. Carver had a very fine orchard last year, and there was a compliment passed by one of the largest and most extensive fruit dealers in the state, and he had been over many orchards. He said: "I have been as far as Colorado west and I have been east, but Mr. Carver has the finest orchard I ever saw, taking the quantity and the quality of the apples. His apples are very nearly all perfect. They are not so large, but they are very perfect, and all of the trees are so universally full." I thought this was quite a compliment to our county.

Mr. C. M. Hobbs—I was in Mr. Carver's orchard last summer, and I do not think that I have ever seen an orchard where the trees were so universally full. They seemed to be as full as they could carry—too full, many of them—and yet they were so perfect. As has been said, the fruit was not so large, but the trees were so full and the fruit was so perfect, free from infection of any kind. He is certainly to be commended as a successful fruit grower. I wish, however, to wash my hands of any connection with the Missing Link apple. I never had anything to do with it whatever.

Mr. Carver—Didn't you tie the blue ribbon on it?

Mr. Hobbs—Maybe. I will have to take that all back; my memory was at fault; for I have probably told that story to you. In the meeting at Springfield several years ago this apple was exhibited, and another gentleman and myself were appointed judges for the central section of the state, and I well remember that this was my first knowledge of this Missing Link apple, the first time I had ever seen it, and the gentleman associated with me thought it ought to have a place as being worthy on account of being a seedling at this exhibit. That was the idea. It was under these conditions that he thought the apple ought to have the premium, and I consented to give it the premium under these conditions, but I have always

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been ashamed of it, and I wish now to retract anything that I have ever done in regard to furthering the interests of the Missing Link apple. And I will also say the same of the Spencer seedling.

Mr. Carver—I told the boys in my orchard to keep away from the Starke trees and that I would give them a nickle for every wormy apple they could find, and they didn't find many. That was when we were picking the Maiden Blush.

Mr. Zion—That is a fine paper, that we heard from Mr. Carver this morning, but there are two or three little things that I would like to ask about. I want to speak about July and August spraying. I know that it is sometimes advocated, but my experience has been that it is not wise to do it. It will not do to go out with the Bordeaux mixture when the sun is coming down at about 110 and scatter the spray over our trees. When it is so hot I would not like even pure water put on my trees. I know that some of the university people advise you to spray in July and August, but it seems to me that it is a dangerous proposition. I have tried it and others may have reason why they do not like it. I fear that the university men who advocate it have not had enough experience. I tried it last year, and this year I started it again. The coddling moth is very destructive this year on account of the limited supply of fruit. I ran the spraying machine two or three days this fall, and I really believe I damaged my orchard at least $200 with that work. I have tried it with different degrees of strength and it has proved a dangerous proposition and I shall never try it again.

For fear there will be a bad impression left about the Starke apple I would like to say that no doubt it does not always do well, but it is a magnificent apple, and my commission man sold them for me at $7.50 per barrel.

Now, then, another proposition: about this Ben Davis apple being a worthless apple. I hope our people, especially the fruit growers, will get that out of their head. Its bad reputation is due to the fact that there are thirty or forty different varieties of apples sent out by nursery men for the Ben Davis. In Southern Illinois the soil is fine, and the beautiful sunlight makes a beautiful, tempting apple. They are, however, a woody apple, but if a good variety of Ben Davis is grown and it is taken care of properly, it is magnificent, both for eating and cooking, at the proper time. If they were not good the people of this country would not pay $7 a barrel for them and only $7 for the Rhode Island Greenings. There must be merit in it. In the New York market the Ben Davis apple sold for more last year than the Baldwin apple, which is praised so highly. I am well satisfied with the Ben Davis apple, if you have the right strain.

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Mr. Carver—The reason I did not spray in August is because I had spent all of my money before that time. I put out at least one hundred pounds of blue vitriol on twenty acres. I have tried spraying in August, but only in a small way, but I have not found any injurious results from it. Possibly you got your mixture too strong for the tender growth at the end of the shoots. They seem to come out for the second time just about the middle of July, and they even start out fresh leaves. I think we had better not say that we will never spray at that time again, but just say that we will not do it until we are convinced differently.

Secretary Flick—I have never used Bordeaux mixture on apples in August, but use arsenate of lead and water. The time for using Bordeaux has already passed, and it will do no good now on apples. But I would say that if our orchards are clean of injurious insects I do not see any use of spraying in August. We have been told that if we get all of the first brood of coddling moths destroyed at the second spraying there would be no second brood, and I think likely that is the case; and yet if the former sprayings have not been successful in destroying the moth we will need to spray later for other and later broods. I want to say, further, that I have had experience in spraying since 1883; perhaps I was one of the first in our part of the state to take it up for controlling insects, and I want to impress on you that you must do the work thoroughly; spraying the first and second time, until the liquid runs down on the branches and down the trunk if necessary. This should be the case, at least in the first spraying before the blossoms comes out, and the second, when the blossomes have fallen; the tree should be wet all over. As Mr. Carver has said, it is necessary to go all around the tree, and I do not believe that it is practical to spray only one side of the tree and then spray the other side when the wind changes. That has not been my experience. When you are spraying go over all sides before quitting, and then you can quit with comparative safety, and if you are careful you can do it without injury to your person and clothes. This can be done if you will take your proper position on the ground or on some elevated platform or on something so that you can get at both top and bottom of the tree. If I were spraying in August I would not use the Bordeaux mixture. I would use the arsenate of lead and water.

Prof. Troop—I would like to ask Mr. Carver what objection he has to the arsenate of lead?

Mr. Carver—I have been told by different persons that the arsenate of lead is one of the best poisons that we have, but the combination of Bordeaux and arsenate of lead, as it is generally made in the common way, is not good, for it simply makes a chemical that destroys the effects of the

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J. W. CARVER'S ORCHARD GREENCASTLE, INDIANA—18,000 BUSHELS FROM TWENTY ACRES.

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SEVEN HUNDRED FOURTEEN-YEAR-OLD BEN DAVIS APPLE TREES—YIELD 2,100 BARRELS—CARVER ORCHARD.

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mixture. That may be wrong, but I believe it is right. If I am wrong I wish you would find out and tell me.

Prof. Troop—Two years ago we used it, but we did not see these effects. There is a danger of injuring the skin of the apple if you happen to get it too strong, and we only used three pounds to fifty gallons, and I guess that was too much, and that two pounds would have been sufficient. This is the only trouble that I have seen in our orchard in using the arsenate of lead. Mr. Burton uses the arsenate of soda, but for some reason he does not get the right combination and it does not work well.

Secretary Flick—Do you use the arsenate with the Bordeaux?

Prof Troop—Yes, sir; sometimes we use it with the Bordeaux mixture.

Secretary Flick—I think that you will find that the Bordeaux caused the thickness of the skin on the apple.

Prof. Troop—Well, we have never used simply the Bordeaux; we have always used some form of arsenic with it. In our first spraying we usually use a strong solution of the Bordeaux before the leaves start and go all over the branches. The mixture should go to the center of the trees and under the branches and on top of the leaves, and for that reason we need a good, strong pressure so that we can force it into every part of the tree, so that the leaves can be covered. A good deal of the spraying over the country does not do any special good, because not thorough.

Mr. Hale—I wish to endorse what has been said on the Ben Davis apple. It is a very good apple when other apples are gone, and for this reason I like it.

President Swaim—We all want to hear how Mr. Hazelett markets his apples, and so we will leave this subject now and take up the next one.

Secretary Flick—I would like to preface what Mr. Hazelett has to say by remarking that he does not do like many of us, sell his apples to a commission man, but he is his own commission man, and I thought that we might get some good ideas from him as to how he markets his fruit.

Mr. Hazelett—

HOW I MARKETED MY APPLES.

The subject assigned me for a paper before this meeting will apply principally to my 1906 crop of apples. The same will also be applicable to other years when I have a crop of this fruit.

It will probably be well to state here that I have two orchards, one in which I live, in the suburbs of Greencastle, where my packing house,

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cider mill, hydraulic press and gasoline engine are located, containing about 18 acres; the other is about one and a half miles from town, containing about thirty acres, without any conveniences. I shall designate the orchard where I live as No. 1 and the latter as No. 2.

My first apples ready for market were the Yellow Transparents in orchard No. 2. The trees were very full and I began by thinning about the first of July, picking the largest and nicest looking ones, packing them in new, clean barrels, and handling them with the greatest of care, as they are one of the most tender varieties that I have. I packed them in the usual way, by facing, etc., excepting that I now always use a cushion of excelsior or paper to prevent their being bruised by pressing in the head of the barrel. I shipped them to the Indianapolis market, where they brought $3.50 per barrel, the smallest price I have ever received since I have learned how to pack and handle. This variety I continued to gather at intervals of about six or eight days until they were all gathered, about the first of August, making three or four pickings altogether, the subsequent shippings bringing $4 to $4.25 per barrel in Indianapolis. It is necessary to gather these apples before they are ripe, as they are too soft for shipment when they become yellow, and the ripe ones were peddled around my own town, at what they would bring.

The next ready for market were the Early Harvest. I had but few trees and they were quite full of nice smooth apples, but I let them get too ripe for shipment, and sold them as I did my ripe Transparents, in my own town, and received but little profit.

Following the Early Harvest came Wolf River and Wealthy. I did with them as with the Yellow Transparent. The trees were loaded and breaking down, and I thinned them when quite green, gathering the largest, packing as before in good new barrels, and shipped a carload of about 200 barrels to the Pittsburg market. The Wolf Rivers brought $3 per bbl. and the Wealthys $2 to $2.50 in that city. The Wolf River being an apple much larger than the Wealthy, poorer in quality, but not nearly so green in looks. Being pleased with my success, as I so considered, for at that time it looked as if we were going to have to give our apples away, I prepared another carload for Pittsburg from the same trees. The Wolf Rivers were much larger and better colored, but the Wealthys still retained their green color. My returns showed that the Wealthy brought about the same price, but the Wolf River had dropped about $1 per bbl. The remainder of the crop of these two varieties was shipped to various points in small lots and brought different prices.

This ended my efforts to make any more sales of apples during the early fall, for apples were selling so cheap that I turned all would-be buyers down. The prices offered were 75 cents and $1 per bbl., the buyer fur-

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nishing the barrels at the railroad station and the seller picking, packing, and hauling barrels to and from the cars.

I had early in the season made arrangements for barrels and cold storage room in Indianapolis, and it was well that I did so, for at gathering time there was no storage room or barrels to be bought, and it was impossible to get barrels as I needed them, although I had received a portion of them before the season had begun. The result was that I had to sell a few carloads of apples at the then prevailing prices, fifty cents per hundred pounds.

I began gathering my apples in the order in which they ripened: Grimes Golden, Salome and Pewaukee about September 15; Stark, Clayton, Rome Beauty, Baldwin, Lawver, Indiana Favorite and Mann, from September 25 to October 2; Ben Davis and Indian, from October 1 to November 9. You will notice the length of time is quite long between the time of beginning and ending with the Ben Davis and Indian, entirely too long, as the gathering should have been completed two or three weeks earlier, but the help could not be secured. Consequently the drop was very heavy and the loss was great. I did not think so at the time, for the fruit buyers and commission men made me feel so blue when they came around that I almost wished I had never owned an apple tree or barreled an apple. Disaster appeared to be staring me in the face, for I had barrels and storage bought, freight bills to pay, labor was high and fifteen to twenty men to pay every Saturday night, and the question with me was where I would find a buyer for my apples at a remunerative price. But I kept on, giving my son, who superintended the packing, instructions to allow nothing in the barrels but good, sound No. 1 apples. I had a large tent in which to temporarily store barrels and apples, and to shelter from rain, which tent came quite handy a number of times. I had no wet barrels nor apples. I kept a team hauling empty barrels to the orchard and full barrels to the car, and the apples were loaded on the wagon as fast as barreled. I frequently had apples in storage within a day after gathering. The result was that every barrel went through in the original package, excepting a carload repacked for export, and four barrels that were frozen on the morning of October 10, which were picked, packed and loaded before I knew of the freeze. There were probably twenty or thirty barrels packed that morning before the frost went out, but I never heard of but the four barrels that were in bad shape, and I lost them entirely.

The culls were left in piles and dropped apples left on the ground where they had fallen, with instructions to sell no apples whatever to anyone in small lots, as the prices then prevailing did not much more than pay for the trouble. This was the state of things in orchard No. 2.

In orchard No. 1 the situation was different. The apples for some rea-

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son were smaller and not so well colored. The fruit buyers would scarcely look at them and I myself was afraid to spend the money for storage, barrels and freight, but I placed a few thousand bushels in common storage at home without any means of cooling except by opening doors of cool nights and closing them during warm days. These apples were gathered very late and kept fine until sold. Now for the marketing of the apples.

The first for sale of the later crop were the culls and the down apples, which were sold in carload lots in nearby towns, after they had been severely frozen a few times and let lay on the ground to thaw out. This was the latter part of November and the first half of December, and at that time they brought me, by wholesale, double the price they would have brought me in the packing season at retail, about 70 to 80 cents per hundred, f. o. b., Greencastle. This began to make me wish they had all been windfalls and culls and saved the expense of barrels, etc. I, however, soon found that there were plenty of localities where they were out of apples and wanted them, the county (Montgomery) lying between this (Tippecanoe) county and our own county of Putnam, taking several carloads during the winter.

Now for the storage apples: The apples which I had in the Indianapolis Cold Storage Co. were kept by the month, costing me 10 cents per barrel per month, and in the Holt Cold Storage Co. 35 cents per barrel for the season, the season ending first of May, 1907. Of course, under that arrangement, I sold the apples out of the Indianapolis storage first, selling my Grimes Golden about the middle of January to a commission house in Indianapolis at $3.50 per barrel. I thought I ought to get $4 per barrel, but they said they were only worth $3, but since it was me they would split the difference and we traded, and I think they afterwards realized $3 to $4 per bushel for the same apples. I continued to sell the apples out of the Indianapolis storage to commission men entirely, at prices that netted me double what I could have gotten for them in the orchard. This was before any sharp raise in price had occurred in the apple market, and the prices were satisfactory to me. In the meantime during the months of January and February, I was selling my small Ben Davis out of the home storage by the carload to be shipped in bulk to points in Tennessee, where I understood they retailed at $1.50 per bushel. I received $1.10 per hundred, f. o. b., Greencastle, which at that time I considered a good price and wished my Ben Davis had all been too small to barrel, as that variety had not yet shown much signs of raising above $2 per barrel. I soon sold the apples out at home and considered that I had done very well, retaining most of my stock in the Holt storage until the month of April. At that time I began to sell, as the storage people refused to make a contract with me to store longer than the first of May. I did not want to be caught in the

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final windup with too many apples, and the commission men were always telling me that they were as high as they were going to be and I would sell them a few hundred barrels on the strength of their statement. But apples, nevertheless, kept on going up and I kept on selling by Ben Davis to them, when I could get my price, to be shipped by them to Philadelphia, Pittsburg, Cleveland, St. Paul and other points, as but few of the Ben Davis variety were ever sold to the consumer in this state. Most all other varieties were sold in the Indianapolis market and surrounding towns. The storage people relented and very kindly allowed my apples to stay beyond the close of the season, the final sales being made about June 20th, the last barrels of apples consisting of Stark, Indian, Clayton, Snow and Rome Beauty, bringing $5 to $7 per barrel in the original package. These apples, excepting the Ben Davis, were sold on commission towards the latter part of the season, bringing me from first to last a net profit of from 100 to 500 per cent. better than I could have done by selling in the orchard in apple-gathering time, or an average probably of 250 per cent., taking the sales from first to last.

The final results of the entire crop were very satisfactory and profitable, my Yellow Transparents, Ben Davis, Grimes Golden, Wealthy and Wolf River yielding me from $150 to $200 per acre. I had the satisfaction of selling apples through commission houses for $5 or $6 per barrel that these same men would not talk about buying at any price in the fall. In connection with the above sales I ran a delivery wagon from my home orchard every week day for the delivery of cider and apples such as my home trade demanded. This brought in quite a revenue that would otherwise have been almost an entire waste. My cider trade was especially good, and having a four-horsepower gasoline engine, a No. 1 Ohio grater, a hydraulic press, with a capacity of 100 barrels per day, the making of cider was but a small matter, and with little expense attached. All cider, after becoming too sharp to suit the trade and all surplus cider, goes into the vinegar tanks through pipes connecting direct with the mill. While everything seemed to be in my favor as the season advanced, and the price of apples with it, still, looking back, I do not think I deserve much credit, for I permitted too many apples to go to waste. My orchard No. 1 lay between a tin plate mill and a town of 5,000 inhabitants; an interurban road was located through the center of my orchard, with the trees cut down and the right of way thrown open, and teams and men by the hundred working in there the entire fall, so my orchard was practically thrown open to the public. The tinplate workmen went through, to and from their work; the town people all had to go out to see how the interurban was progressing, and how the tinplate mills were getting along; all strangers and students of De Pauw had to see the orchard and big cider mill and test the cider (which

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had to be done frequently), and the result was that orchard No. 1 was a free public park from August to January. You may think this was aggravating, but it was not, as I considered that I was being assisted in caring for an almost worthless crop without cost, for I had been told by men in whom I had the greatest confidence, that apples were not worth much of anything. I believe that for making one believe that he has nothing that is worth anything, the average apple buyer takes the cake, having no near competitor, unless it is the horse buyer.

My experience has been that I can store my own apples at better advantage than selling in the orchard. The apple buyer and the commission man are all right and a necessity. They are handling most of my apples, but it is after they are stored, and then I usually sell direct to them. I have found them as honest as any other class of business men, but I look after my own interests as far as possible.

Here I will make a little mention of the marketing of this year's crop. The Yellow Transparents, in orchard No. 1, were full this year, while there were none in No. 2, while just the reverse was true last year, they being an every-other-year crop with me, never having failed to carry this program out since about the fourth or fifth year, of alternating between the two orchards, the trees now being about sixteen or seventeen years old. I thinned as usual, commencing on the 10th day of July, when they were quite small, the size of a walnut and larger. I was surprised that they brought $6 per barrel in Indianapolis and kept going up until they reached $8 per barrel, the last four shipments bringing that price. The remarkable thing about these sales was that out of forty-four barrels, there were only two barrels of culls and pick-ups, such as I usually allow to go to waste, that brought $4 per barrel.

My loss through inability to collect on my entire sales last year, amounting to seven or eight thousand dollars, was seventy-five cents on apples and one dollar on cider, the former buyer having moved away, and the latter pays his beer bills first.

President Swaim—We will now devote a few minutes to the discussion of this paper.

Mr. Zion—I would like to ask Mr. Hazelett about the vinegar business, and if he disposes of all that he makes of it.

Mr. Hazelett—I am not making a great effort at that now.. I only have a small retail trade, but I have not made a great effort to secure outside trade, but I have quite a large wholesale trade at home.

Prof. Troop—I would like to ask Mr. Hazelett if he would consider it good policy at this time to sell a crop of apples in the orchard for the price

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which they are paying at the present time (August) this year, knowing what you do about the crop generally?

Mr. Hazelett—It is a matter of speculation. They are making very good prices for apples, three to three-fifty, and last year it was from seventy-five cents to one dollar. I have always made a practice of handling my own apples and I think I have been successful. After my apples were stored last year I could have got double the net profit over what I would have got if I had sold them in my orchard.

Mr. Zion—What do you have to pay for help?

Mr. Hazelett—One dollar and sixty-five cents for ten hours.

Mr. Carver—We only work nine hours and pay $1.50. Table and apron men get $2.

Mr. Hazelett—We work ten hours and pay $1.65.

President Swaim—If any one has anything to add we will listen.

Mr. Snodgrass—I do not know whether what I have to say will be in order or not, but I would like to know if there is anyone in the hall who knows anything about the seedless apple? I have seen it advertised by some men who advertise themselves as very prominent nurserymen, and if there is anyone here who knows about this apple he ought to tell us about it.

President Swaim—Mr. Hobbs, what do you know?

Mr. Hobbs—It has been advertised in the papers and quite a good deal has been said about it and against the seedless apple. Now about this particular variety that is being promoted, the Spencer Seedling, I know but little. I have never seen it but once, and have therefore had no experience at all. I have known the history of several others, and as far as I know none of them has proved to be a success. They are off in color and are not productive; it is simply a fake and amounts to nothing in a practical way.

Mr. Ragan—My hearing is so bad that I do not hear all that is said, but I presume from what Mr. Hobbs has said that the Spencer Seedling is under discussion. It happened to fall to my lot to be on duty at St. Louis when the specimens that were finally submitted by the Spencer Company came in, and Prof. Taft and I examined some of them. Of course these people selected their best apples, but it is just as Mr. Hobbs has said. The seedless apple has been known for hundreds of years, and where apples are grown, occasionally an abnormal form is affected. The seedless apple is simply an abnormal form. In the first place the flower is a little different, and it has been called the bloomless, and while it is known as the seedless there are usually seeds, but they are usually abnormally put, sometimes in

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the cheek of the apples, and sometimes there are two cores, one on top of the other, and what few seeds they may have are placed out of their order in this way. Two of the specimens were cut by Prof. Taft and myself; each had a fully developed core, but had no perfect seeds, but one had a seed that the knife cut through when we were cutting a cross section. The whole scheme is fraudulent, and I do not hesitate to say so, and these gentlemen themselves have finally admitted the facts. If you are a reader of the Rural New Yorker you will remember an article in the paper in which they investigated this matter, and you will find that that company has finally abandoned everything they advertise in connection with their original proposition, except simply to say that it is a curiosity and that they are offering it as such. There is a seedless apple, Mr. Hazelett, just opposite your place in Greencastle. The first that I ever noticed personally was in Montgomery county, and Mr. James Little discovered it. They are simply a freak of nature, and the whole matter has been abandoned, except that this company is still selling them and are not declining to take two dollars for a little tree when they can get it. With intelligent, well-informed men the whole subject has been exploded. I have quite a history on this subject, dating back more than two years, which I have in my office in Washington, in reference to this particular Spencer Seedless, which I have collected from different publications. One of the last and most successful schemes of all connected with it was secured by the personal visit of Mr. Lord of Canada, former minister of agriculture to Ontario. He went to Colorado and saw the best side of everything and made a report when he returned, but that has been all exploded and taken back and proven to be misleading, notwithstanding his titled position.

Mr. Zion—How about the King of England? How did he endorse it?

Prof. Ragan—He evidently got some of the best specimens, but I can't just remember the story; but I believe that it was endorsed through misrepresentation to himself and with the very best specimens, but I believe the story goes that they were sold for charity, and I believe they brought more than Mr. Hazelett has been getting for his apples, but the fellow who purchased them found out that they were not just what they were supposed to be, and they went back on the whole thing. Editors of papers were certainly worked successfully with this apple, although they are usually pretty hard to work, and nearly every paper in the United States fell in. In the meantime the California Fruit Grower, a very fine paper, and well edited by a man who keeps his eyes open, had an item about like this: "If the seedless apple company succeed in disposing of their product as well as they have hoodwinked the papers in getting free advertising they will soon be able to hire John D. for an office boy." But that was before Judge Landis got at John.

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Mr. Houston—I want to know if any of you are acquainted with the Surprise apple. This is an apple that has a very bright red flush, and the only ones that I have ever seen in this state were in Franklin county.

Mr. Grossman—I saw some in our county two years ago. I can not now tell any particulars, but I'll find out.

Walter Ratliff—In Wayne county we have two or more trees.

President Swaim—We will now have the report of the Committee on Awards.

Your Committee makes the following report:

Collection Gladiolus—
First—E. Y. Teas, Centerville..... 3 00
Second—F. Darnell & Son, Lafayette..... 2 00

Collection Sweet Peas—
First—Mrs. H. J. Hale, Indianapolis..... 2 00

Collection Cut Flowers—
First—F. Darnell & Son..... 3 00

Collection Nasturtiums—
First—Mrs. Henry J. Hale..... 3 00

Collection of Potatoes—
First—J. M. Snodgrass, Kirklin..... 5 00

Collection of Onions—
First—A. W. Ritterskamp, Princeton..... 5 00

Plate Red Stripe Apples—
Third—Henry J. Hale, Indianapolis..... 50

Plate Red Astrachan Apples—
First—Henry J. Hale, Indianapolis..... 1 00

Plate Telopsky Apples—
Second—Henry J. Hale, Indianapolis..... 75

Plate Yellow Transparent Apples—
First, second and third—Samuel A. Hazelett, Greencastle..... 2 25

Plate Indian Apples—
First—Samuel A. Hazelett, Greencastle..... 1 00

Plate Chenango Apples—
First—Henry J. Hale, Indianapolis..... 1 00

Plate Champion Peaches—
First—J. M. Snodgrass, Kirklin..... 1 00

Plate Crasley Peaches—
First—J. M. Snodgrass, Kirklin..... 1 00

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Plate Wilder Early Peas—

First—Henry J. Hale, Indianapolis.....$1 00

Plate Koonse Peas—

First—Henry J. Hale, Indianapolis..... 1 00

On motion the report was approved.

President Swaim—If there is nothing further the meeting will stand adjourned for the noon recess.

The meeting stood adjourned until 1:30 p. m.

THURSDAY AFTERNOON SESSION.

President Swaim—We will now have the report of the Committee on Resolutions.

Secretary Flick—Mr. Chairman, the following was handed to me by the committee:

Whereas, It is the opinion of the Horticultural Department of the Station and of the Horticultural Society, that there is an opportunity for useful work to be done by these two organizations working together, therefore, be it

Resolved, That the president of the Society appoint a committee of three, of which the president of the Society shall be chairman, to act in co-operation with the Horticultural Department of the Experiment Station in planning and carrying out a program of spraying demonstrations, lectures, etc., during the coming fall and spring, the manner, time and place of holding the same to be arranged as the committee subsequently sees fit; and

Whereas, It is the sentiment of the Society that the plans as outlined by the Horticultural Department of the Station in regard to co-operative work promise to be of great value to the fruit growers of the state, therefore, be it

Resolved, That the local horticultural societies be hereby requested to provide experimental orchards in their respective counties at which experimental and demonstrational work in horticulture can be carried on in co-operation with the Horticultural Department, and

Whereas, Since at the Annual Farmers' Short Course at Purdue University there are a large number of farmers, especially young men, who ought to be in touch with the work of the Society, therefore, be it

Resolved, That in order to promote the cause of horticulture in the state, it shall hereafter be the policy of the Society to make an annual fruit exhibit at this place and give prizes therefor as in the regular winter meetings, and be it

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Resolved, That the members of the Horticultural Society give especial attention to the encouragement of the attendance of the young men and women of the farms at the Farmers' Short Course at Purdue University, and

Whereas, It is the opinion of the Society that the horticultural interests of the state are not receiving adequate attention in the Farmers' Institutes, therefore, be it

Resolved, That the secretary of the Society call the attention of the leading fruit growers of each county to this deplorable condition and urge that they individually take up the matter of horticultural instruction at Farmers' Institutes with their local institute management to the end that more attention be given and greater interest developed in the growing of more and better fruit, and be it further

Resolved, That the Horticultural Society extend their appreciative thanks to Purdue University and Experiment Station for the courtesy, kindness and hospitality which has been so heartily extended to them during this meeting.

M. J. FERGUSON,
C. G. WOODBURY,
F. A. FORBES,
Committee on Resolutions.

Sylvester Johnson—I move the adoption of the resolutions.

Mr. Zion—There is a great deal in that which I do not understand. Where are you going to get the money to establish these experimental stations?

President Swaim—The secretary will read that clause again.

Secretary Flick reread the clause in question.

President Swaim—I do not see anything in that which would bind this Society to spend any money.

Prof. Woodbury—I will say that there was nothing in the mind of the Committee on Resolutions, or nothing in the wording of the resolution which would lead one to think that there would be any additional expense to the Society, further than what they are now doing. The request for the experimental orchards was to develop interest in the local societies. I do not think there is anything lost by experiments thus carried on, for the people of the state, in any way, shape or form.

Mr. Milhouse—I would say that Purdue is now starting out in experimental work located throughout the state, and I think that this committee had in mind the extension of the facilities of the department so that they would get more effective work. For instance, if the Marion County So-

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ciety wishes Purdue to come and do some experimental work for them they will select an orchard for the purpose so that everybody will know just where and when to expect the work to be done, and I think in this way we will create an interest in the workand much more good will be done.

Mr. Fowler—I second the adoption of the resolution as read.

Voted on and carried.

Prof. Troop—I want to say a word in regard to the Farmers' Short Course. Last year, as Mr. Woodbury suggested in his paper, we had just a few apples brought in by different ones; there wasn't any effort made to make an exhibit of fruit at the regular corn school which we had been having, and this school has been named as the Farmers' Short Course. Some of the members brought in some apples and we had an exhibit last winter which attracted considerable attention. This appealed to us as a good idea and we thought if the Society would take hold of this with us and offer premiums the same as they do in the other meetings it would bring out more fruit, create more interest along that line and we could have a fine showing here that would attract attention and the probable result would be that it would bring out the young people, which we are anxious to do, and I hope that when the members of this Society go home they will talk the matter up and keep it in mind, and, when the time comes, help encourage the scheme and we will get out a nice exhibit of apples as well as of corn.

Secretary Flick—I have a communication here from the Mississippi Valley Apple Growers' Association which I am requested to present to you for consideration. It is a communication from that society asking us to endorse the celebration of a national apple day, and as it is long I will not read it unless upon request.

C. M. Hobbs—What is the significance of the apple day? Is every one to stuff himself full of apples on that day?

Secretary Flick—I suppose that it is about the same as our Arbor day and other national holidays, a day on which to popularize the apple and one which would be observed by the schools, and possibly there would be a distribution of apples at the state eleemosynary institutions and perhaps some liberal citizens might furnish apples to distribute to the public schools of the different cities and towns; and then there could be appropriate exercises, in which the children would take part on the program. I move that the Society approve of the recommendation.

Prof. Troop—I second the motion.

Voted on and carried.

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President Swaim—We will now have the next on the program, which is "Our Insect Friends," by Prof. Troop.

Prof. Troop—I would a great deal rather talk to you, but there is so much to say on the subject that I fear I might run over my time, and so I have prepared a paper, which I will read.

SOME OF OUR INSECT FRIENDS.

PROF. J. TROOP, PURDUE EXPERIMENT STATION, LAFAYETTE, IND.

In speaking of our insect friends I have in mind, not so much those species which are commonly thought of as being of immediate commercial importance, such as the honey bee and the silk worm, but those which assist the farmer and fruit grower in his warfare against the noxious hordes which are constantly preying upon his crops.

Few people who have not made a special study of this subject have any adequate idea of the importance of this subject, and fewer still have any knowledge of the life histories of these various species of parasites which get their living, wholly or in part, from the bodies of the noxious tribes. And yet, it may be truly said that there is scarcely a species of our native insects found in our fields, orchards or gardens today that does not have one or more insect enemies which prey upon it. And it may be said that, as a general proposition, these parasites are able to hold in check these noxious forms, and largely to prevent the destruction of crops which would otherwise take place. Nature provides for an evening-up process among the lower as well as the higher forms of life. True, we have a number of species which these parasites do not seem to control, but these are, for the most part, foreigners, whose natural enemies were left behind them when they were brought to this country, for example, the San Jose scale, Gypsy moth and the Brown-tail moth; but as these parasites have a wonderful faculty of adapting themselves to circumstances, it will not be long until some of our native species will have found that these foreigners make as good eating as their native brethren.

We are in the habit of dividing these little friends of ours into two classes, viz.: predaceous and parasitis insects. The first includes those species which feed wholly or in part upon other insects, and which catch and devour their prey. either in the egg, larval or adult stages. Of this class, perhaps the greater portion of them belong to the order Coleoptera, or beetles, although a number of the other orders play an important part, e. g., the wasps, among the Hymenoptera, the Mantidæ of the Orthoptera, and some of the true bugs, or Hemiptera.

Among the more common species of the Coleoptera, which belong to this class, are what are commonly known as ground beetles, belonging to

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the family Carabidæ, of which Calosoma Calidum and C. scrutator are familiar examples. These beetles seldom fly by day, but owing to their long legs they can run very swiftly, hence are known as "runners" or "ground beetles." They hide by day under stones, sticks, logs, etc., and do their hunting by night; hence they are seldom seen except by the collector who knows where to look for them. They often climb trees and feed on caterpillars. They are often found in orchards infested by the tent caterpillar, hidden at the base of the trees.

The family Cicindelidæ, or "tiger beetles," also play an important part in this connection. These, too, are swift runners, and their color often matches their surroundings very closely, so as to make them quite inconspicuous. The beetles are therefore enabled to get near enough to their prey to enable them to capture it without much effort. The larvæ of these species live in holes in the ground and do valiant service to the farmer or fruit grower by capturing any unwary insect that happens to pass that way. There are other families which have similar habits, but I suspect that the most important family in this connection, belonging to this order, is the Coccinellidæ, or "Lady birds," sometimes called "Lady bugs." They are designated by their rather small, oval or round bodies, and by their colors, which are usually either of some shade of red with black spots or black with red or yellow spots. This family consists of a good many species, and in nearly all cases they are predaceous, their prey, consisting for the most part, of plant lice and small insects. It is one of these species that renders the San Jose scale practically inoperative in its native country, and which the Department of Agriculture has been trying to introduce into this country. It is very largely due to the efforts of these little friends that our own native scale insects and plant lice are not more troublesome.

Members of the family Mantidæ, which belongs to the order Orthoptera, which includes the grasshoppers, are known as "graspers" from the fact that their forelegs are very strong and adapted for grasping and holding their prey until it can be devoured. They are clumsy, heavy-bodied insects, with short, broad wings, with the head so set as to be capable of lateral motion. In fact this is the only insect capable of turning its head when it wishes to look in different directions. Mimicry is often displayed here to a remarkable degree, and it is this fact that enables it to secure its prey, as its resemblance to the leaves or twigs of trees is so complete as to often render it quite difficult for a person to detect it, hence before the victim is aware of its fate it finds itself within the grasp of those powerful forelegs.

The Odonata, or lace-wings, commonly called "snake feeders," are predaceous in both the larval and adult stages, but as it is aquatic in the larval stage, it often does as much harm as good, by devouring small fish,

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and perhaps other beneficial animals. The adult takes its food wholly on the wing, and so catches and devours innumerable flies, mosquitoes and other small insects.

Parasitic Insects.—Our parasitic friends belong, for the most part, to the two orders, Diptera and Hymenoptera, or to the two-winged flies and to the bees. It is to this class that the farmer and fruit grower must look for relief whenever certain injurious species break out in such numbers, and cover such a wide stretch of country as to make it practically impossible to control them with insecticides. As, for example, such an outbreak of the green aphis as appeared to be prevalent during the past few months, which was perhaps no more extensive than happens every year, or whenever any particular species of cutworm makes its appearance in unusually large numbers, or in case of an undue increase in the stock of Hessian fly. It is then that these little parasitic flies, finding an abundance of their favorite food, increase very rapidly, and soon have their victims under control. These little friends may be divided into two classes; first, those which lay their eggs either upon or within the bodies of their victims, and second, those which lay their eggs upon the eggs of their hosts. In the first case the egg of the parasite soon hatches and the larva feeds upon the caterpillar or whatever it happens to be. In some cases there may be as many as forty or fifty eggs placed within the body of a single larva. In any case the parasitized larva never comes to maturity. These little parasitic flies vary in size all the way from almost microscopic little fellows to the large, long-tailed Thalessa lunator, with an ovipositor five or six inches in length, which it uses in forcing its eggs through the bark and wood of trees and laying them in the burrows or upon the bodies of certain wood borers, notably the larva of the pigeon tremex. The green aphis, or plant lice, furnish the favorite diet for many species of this parasite. A field of grain may be swarming, as it were, today, with these lice, and within a week or ten days scarcely a live louse can be found; all of which may be due to the efforts of the parasites.

The species of egg-parasites are, for the most part, of smaller size than those just mentioned, but no less effective in their operations. A moth or a butterfly lays its eggs upon a growing plant; the natural supposition would be that those eggs would hatch and the larvæ would devour the plant; but along comes one of these minute flies—so small sometimes that it almost requires a microscope to see it—and deposits an egg upon this egg. The parasite's egg hatches first and the young larva proceeds to feed upon the caterpillar's egg, which contains sufficient nourishment to bring it to maturity, when it passes through its transformations and is then ready to repeat the performance; and this thing goes on as long as there is anything left for it to work upon. Whenever its favorite food has be-

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come exhausted, then, of course, the parasite dies off. And so we have seasons when the noxious tribes are abundant, and seasons of scarcity, which is very largely due to the presence or absence of these insect friends.

Mrs. Hazelett—I would like to ask if this bug is the same one that infests my rose bushes. They seem to be covered with some sort of a louse, and I have sprayed them with hot tobacco water, but I don't suppose I could get at all of them.

Pro. Troop—There is hardly a species of plant but has a species of plant louse, and they work mostly in the same way, getting their living by sucking the juice. I might say here that you must use something to kill them that will come in direct contact with them; tobacco water is something of that kind and so is insect powder. The apple louse is an entirely different species, but, as I have said, they all are somewhat similar.

President Swaim—Can you tell us anything about the insect that is working on the Colorado potato bug?

Prof. Troop—There is one that is quite common which works on the potato beetle, and they have been called the stink bug. Most any one who works with berries knows what it is, especially if they ever got one in their mouth. They get on the young potato beetles and suck the life out of them.

Mr. Hale—I have noticed that about this time of the year there will be found lots of potato bugs on the potatoes, and in a short time there won't be any, and yet, nothing done by anyone to destroy them. Is this due to this bug.

Prof. Troop—That is possibly caused by some one of the parasites working on them.

President Swaim—The reason I asked this question is because I was talking with a gentleman from Iowa and he told me that the Colorado potato bug had disappeared and they hadn't seen it for several years. I think he said it had been four years since they had seen a specimen, and it would be interesting to know if that parasite is likely to work in our direction.

Prof. Troop—Yes, if it feeds on the potato beetle it will go wherever the beetle goes; it will follow it up. This may be one that has recently developed, and if it is, it will follow the beetle up.

Mr. Walker—I would like to inquire if you have discovered what the insect is that infected our trees. I think it was Prof. Woodbury who brought some of them to his office for identification.

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Prof. Woodbury—I think it is a species of the Lady bug.

Mr. Hale—The Tiger beetle will destroy the Colorado potato bug. My orchard seems to have attracted the snowy cricket, and when I was picking apples last summer I noticed one on a Maiden Blush apple. I watched it for some time and it put its bill into the flesh and turned it around and around. I watched it for fifteen or twenty minutes. There were several other holes near this one. They destroyed a great many of my nicest apples in this way.

Mr. Milhous—What are the Lady bugs doing when we see them on our plants?

Prof. Troop—They are after lice. Whenever you see Lady bugs on your plants you may be sure there are plant lice there.

Mr. Hobbs—We had trouble with aphis on our cherry trees. We tried spraying them with a solution, but we found it ineffective and we had to go over them and dip the long shoots into the solution. They are two years old, and when we had to dip all of them it was no small undertaking. On Saturday night at dark we hadn't got quite through with the block. I told the boys to take up the work on the next Monday morning where they left off and before they dipped the trees to shake them well so that the little parasites would drop off. When the foreman set the men to work on Monday morning they found that the lice were gone. Now you see the parasites had been at work. The black aphis had killed several of the trees that we didn't treat.

Chairman Swaim—Well, those litle insects had evidently worked overtime. Prof. Whitten has not arrived yet.

Prof. Troop—I think you will find that he is laid up somewhere on account of the storm, because he is a man who usually keeps his engagements whenever it is possible to do so.

Chairman Swaim—If Dr. Barnard is present we will hear from him on "Value of Pure Food Laws to Horticulturists."

Dr. H. E. Barnard—

THE VALUE OF PURE FOOD LAWS TO HORTICULTURISTS.

BY DR. H. E. BARNARD, STATE FOOD AND DRUG COMMISSIONER, INDIANAPOLIS, IND.

For twenty years and more there has been a constant agitation in behalf of pure foods, and the proceedings of legislative bodies, either state or national, that have not each session given some consideration to the subject, are not recorded in history. The agitation has usually been accompanied by much wind, but when the blow was over, but little damage to

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the business interests which opposed the legislation on pure food subjects was ever noted.

It is a most interesting fact, illustrating well the peculiar attitude that some legislation assumes, that the pure food movement had always been presented to the lawmakers as a health measure and a great and absolute necessity if we were to save the lives of our babies and keep the scourge of poisoned food off our home. For years we have been taught to look upon food adulteration as a menace to health and the unscrupulous manufacturer or dealer as a candidate for the regions of utter darkness. And even now the space writer who wishes to attract attention to his pure food articles points out to us the evils of aniline dyed candies and alum baking powder.

As a matter of fact the pure food question is an economic one, for the most part affecting the wealth of our citizens and not their health. And moreover, though this phase of the subject is very rarely referred to, the consumer is by no means the only one whose purse is lightened by the thrifty manufacturer who has learned how to make strawberry jam out of apple jelly, glucose, aniline dyes and clover seed. In just as great a measure as the consumer has been cheated, so the legitimate producer has suffered by the loss of his market. The consumer may be in position to realize his loss and even to estimate it in dollars and cents, but the producer rarely ever knows that his financial welfare is affected by food adulteration.

And this brings me to my subject, "The Value of Pure Food Laws to Horticulturists." The question is now a very live one. In France it has assumed proportions so great that the safety of the government has been endangered. The trouble among the wine growers of southern France is simply a protest on the part of the producers against a food adulteration that destroyed their market. The wine growers, a sturdy, independent, thrifty class, who, by their industry, have converted the hillsides of a rough country into gardens growing grapes to make millions of gallons of wine each year, found that they were less and less able to get a fair price for their product and that their wines were not readily sought as they once were. The situation became so serious that they commenced to look for the reason why. They found that their wines were not selling because certain firms who grew no grapes were distributing great quantities of artificial wine; in fact, that their product—their pride and principal source of revenue—was so heavily counterfeited that their market was being taken away from them, and the taste for their product was being destroyed because of the vile character of the substituted counterfeit article. The peasants saw but one thing to do, and they did it. They protested—vigorously—and, peculiarly, their protest was raised against

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the government, whom they held responsible for their welfare, and so responsible for the products that were ruining them. They refused to pay taxes, rose in rebellion, the army was called on to quiet them, and it was found that the soldiers were in sympathy with their fellow citizens, so much so that they threw down their arms and went over to the insurgents. Then the government woke up, just as our government did when the Chicago meat scandal, a year and a half ago, nauseated us.

At present Dr. Wiley, our own great food expert, peculiarly our own, for he was born in this state, educated here and for years taught on this campus, is in southern France at the invitation of the French government, trying to do for that people what he has done for us, that is, give to the producers the market his honest goods have fairly earned.

The horticulturist should be more insistent for pure food laws than any other citizen, because his products are most subject to adulteration. The grain grower is not injured by impure food, because grain products are not adulterated. Neither are the vegetables and canned goods, sugars and meat products—at least in a manner that affects the quantity of raw material required for a year's consumption.

But this is not true of the products of the orchard, the vineyard or the berry fields. Flour can only be made by grinding grain, beef by converting grass into cattle, canned corn and beans and peas by putting the genuine vegetables into appropriate packages, but cider vinegar is made without the aid of a sour apple tree. Wine is still produced after the manner described by Addison 300 years ago in the Tatler, who, speaking of adulterators, said:

"These subtle philosophers are daily employed in the transmutation of liquors, and by the power of magical drugs and incantations raise under the streets of London the choicest products of the hills and valleys of France; they squeeze Bordeaux out of the sloe, and draw champagne from an apple."

Jellies and jams need never know the color of a strawberry to go to the market under that label, and the chemical laboratory is parent to a host of delicacies we in our ignorance think to be the gift of the Goddess Pomona.

What do you think is the loss to the apple growers of Indiana by reason of the sale of fraudulent cider vinegar? I know of one apple grower who allowed 5,000 bushels of apples to rot on the ground because they were not worth grinding, and the same grower has a hundred barrels of vinegar in his cellar that he cannot market at a price that will recompense him for his labor. Two years ago when the state laboratory commenced work we found that of 145 samples of cider vinegar but twelve were pure. The rest were made by distilling a sour grain mash and adding

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burnt sugar to the acetic acid so obtained. Of course cider vinegar was not wanted at twenty-five cents a gallon when distilled vinegar, colored and flavored to resemble cider vinegar, could be bought for six cents a gallon. It costs ten cents a gallon to produce cider vinegar; the artificial can be made for three cents or even less. I received quotations last week that offered a good article for a cent a gallon—thirty-six cents a barrel.

It is probable that a million gallons of artificial cider vinegar—25,000 barrels—have been sold every year in this state, displacing the product of at least 250,000 bushels of apples and turning $100,000 from the pockets of our fruit growers into the well lined purses of the rascally manufacturers in St. Louis and Louisville.

Grapes are not extensively grown in this state—not that they can not be grown, for southern Indiana can be made to produce as fine grapes as France or Italy. Nicholas Longworth of Cincinnati years ago demonstrated the suitability of the Ohio River Valley and its rugged contour for grape culture. But why should we grow grapes to turn into wine when an apparently satisfactory article can be made from water, alcohol, glucose, glycerine, aniline dye and synthetic flavors. Of twenty wines examined at the state laboratory but four were genuine grape products. Is it any wonder that the French wine makers are in rebellion and that we grow grapes only to make into jelly and jam?

In California the vineyardists have seen the necessity for suppressing fraud in wines, and some years ago formed a strong organization to promote the purity of their product. So successful has been their work that today a wine coming from California is sure to be genuine, and as a consequence California wines are rapidly winning the American market and are even sold in France and Italy in considerable amounts.

Fruit preserves are almost a necessity at certain seasons of the year. Years ago the standing of a housewife was estimated by the number of jars of fruit in her cellar. Sad to relate, today she, too, often depends upon the grocer to furnish her preserves. And if her husband, in his wonder at the change in the taste of currant jelly since his boyhood days, could only know the origin of the modern currant jelly, he would lose his appetite and go back to dried apples.

Of 113 samples of fruit products put up in glass analyzed by us last year, 93, or 82.3 per cent were impure. The basis of these cheap jellies and jams is apple stock and glucose, which, properly colored and flavored, may bear any label required with as good grace as if it were the really true article.

I have seen currant, blackberry, raspberry, strawberry, grape, peach and apple jelly that was exactly alike in every particular except the label, and of the lot, the apple was the only genuine product. Such goods are

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cheaply made and are sometimes edible. But every jar sold, to that extent, injures the market for the genuine article. And that is one of the reasons why you have had to sell your berries to fruit packers at such low prices. If there was no competition in the shape of artificial foods, the true fruit would be demanded—and you know the demand fixes the price.

The horticulturist does not produce a fruit that does not go to market to compete with some substitute. This has been more the case in the past than at present, I am glad to say, for the new federal and state laws will check food adulteration and secure for you better markets and better prices, and for the consumer the satisfaction of knowing that he is paying for fruits and not some manufactured substitute.

Chairman Swaim—Has any one any remarks to make on this paper?

Mr. Zion—A year ago in Arkansas and Missouri they had thousands of barrels of apples affected by the bitter rot on the skin. I was in Indianapolis at the time twenty carloads of these apples arrived there. I inquired of one of four leading commission men what they were going to do with this fruit. He referred me to the man in the switch yard packing fruit. I went to see him and found him in a car with two men, picking and sorting apples. There was not a healthy apple in that car, and some of them were from one-fourth to three-fourths rotten. The business of one of these men was to select apples for the top of the barrel. I asked what they were going to do with these apples and where they could find a market. He told me they were going to ship them East. Well, I know that these apples were going to be sold in Indianapolis by peddlers, and before I left there a peddler came along and bought seven barrels of them and took them out to sell them. I want to ask the doctor if there is not a law which empowers the Pure Food inspector, when he finds any apples infected with contagious diseases that might be spread by handling the fruit, to condemn those apples wherever he finds them in the State of Indiana.

Dr. Barnard—I think there should be such a law as that, and the person handling them should be liable for prosecution. In regard to the insects, I doubt if the pure food law could touch them. You can prevent the distribution of nursery stock that is infected.

Mr. Hale—Some years ago I was gathering apples and my grandsons were with me, and I told them they might have the culls and sell them to the preserve factory. A dispute arose among the boys as to how bad the apples could be when they put them in for the factory and when I was over I asked the manager the limit as to rottenness in apples before they refused to accept them, and he said that they would accept anything. After

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that you could not get those boys to eat any more factory apple butter, for they seemed to think they knew what it was made out of and I expect that possibly they were right.

President Swaim—Dr. Barnard spoke in his paper about wines. In South Bend we have a large foreign population working in the factories there. When grapes can be had they usually buy them from one to one and one-half cents per pound, or twenty to thirty dollars a ton, and they buy a great quantity of them and make their own wines. There is almost an unlimited market for grapes there when you want to sell them in the bulk. I believe that in southern Indiana one could raise ideal grapes. We haven't in northern Indiana any grapes this year, because the vines froze out. There is an unlimited demand for bulk grapes with us, because these people buy them and make wine and drink it themselves. I think they let it ferment before they press it out. I presume they may in some cases make white wine, but they commonly make red wine. I mentioned this because I thought it might be of some interest to some of the members present.

The next on our program is a paper on "Composition and Quality of Irish Potatoes as Affected by Different Soils and Fertilizers," by Prof. D. B. Conner of Lafayette. Prof. Conner is not here, but he has sent his paper. What shall we do with it?

Sylvester Johnson—I move that the paper be printed in the proceedings without reading.

Mr. Snodgrass—I second the motion.

Seconded, voted on and carried.

COMPOSITION AND QUALITY OF IRISH POTATOES AS AFFECTED BY DIFFERENT SOILS AND FERTILIZERS.

BY PROF. D. B. CONNER, LAFAYETTE, IND.

Potatoes vary in composition probably as much as any of the plant products that are used as human food. It has long been a common belief that potatoes grown on muck or peaty soil were not of as good cooking quality as those grown on other soils. It was to ascertain if this statement was true, and, if so, to find out if the quality of such potatoes could be improved by the application of any particular plant food, that this work was undertaken.

A study has also been made of the variations in composition, due to different fertilizers, on a black loam soil and on a yellow clay soil.

One of the first characteristics noticeable on analyzing the different samples was the almost universal high moisture content. This seems to

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be a common characteristic of Indiana potatoes. In Bulletin No. 56 of the Virginia Experiment Station, a number of analyses of potatoes from different states are reported, the moisture content of which are as follows:

TABLE NO. I.

State.	Per cent moisture.
Virginia	76 79
Michigan	77 83
Pennsylvania	79 42
Massachusetts	77 95
Connecticut	77 26
Maine	79 82
Indiana	81 13
North Carolina	79 99

These figures are an average of several samples from each state, and as a rule the same varieties. Although Indiana potatoes have a high moisture content, it does not follow that such potatoes are of the poorest quality. Dr. H. W. Wiley states that, although potatoes grown in Maine are less rich in starch than those grown in foreign countries, yet those grown in Maine are more palatable to the American taste than those grown in Germany.* The standard of culinary value, however, varies in different countries. In this country the most desirable potato is the one which is white in color and floury and cooks up mealy, while potatoes which are colored, strong flavored, or soggy after boiling, are not desirable. On the other hand, it seems that the reverse is true in France. Coudon and Bussard, two French scientists, in an article published in Annales de la Science Agronomique (2d Series, Vol. I, 1897), say that from a chemical standpoint good cooking potatoes are characterized, by first, aqueousness; second, richness in nitrogenous matter, principally in albuminoids; third, relative poorness in starch.

In investigations at Cornell† the following conclusions were reached: "The culinary and dietetic quality of potatoes is not dependent upon chemical composition so much as it is upon anatomical (and perhaps physiological) characteristics of the tuber, and the arrangement and distribution of starch and water areas in its substance."

In a paper published by S. F. Ashby, Carnegie research scholar at Rothamsted, England,‡ the conclusion is reached that the cooking quality of potatoes, especially the blackening of the tubers on boiling, or on the second warming, is not caused so much by the low starch content or the

*Bulletin 58, Division of Chemistry, U. S. D. A.
†Cornell Bulletin 230.
‡Journal of Agricultural Science, October, 1905.

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high protein content, as by the composition of the crude protein. Potatoes that had less than 45 per cent of the total protein, as albuminoids, were good. If more than 45 per cent of the total protein was albuminoid the potato was poor in quality.

There are quite a number of factors that may influence the composition of the potato, the more important of which are the following:

First, the climate; that is, the daily range of temperature and moisture during the growing season.

Second, the stage of maturity; that is, the degree of ripeness of the tuber when the plant dies, or when the tubers are dug.

Third, the variety and quality of the seed.

Fourth, the type of the soil and its physical condition.

Fifth, the available plant food, which may be in the soil naturally or which may be applied as manure or fertilizer.

Of course, potatoes may deteriorate under improper or unfavorable storage conditions, and the chemical composition be correspondingly altered.

The first factor, the variations in climate, although probably the main one in influencing quality of the tuber, will not be discussed in this paper, as under ordinary conditions it is a factor which is entirely beyond the ability of the farmer to control.

The second factor, the stage of maturity, has not been studied experimentally in this investigation; however, it is one that may play a very important part in affecting the composition. To a certain degree, it is practicable for the grower to regulate, or at least to retard, the premature ripening of the vines, which may be caused by blight or other diseases. Careful spraying with the proper mixtures, will, in most cases, insure good maturity. Too late planting may cause immaturity on account of frost overtaking the growing crop. This, of course, can be guarded against.

The above factors have been studied at the Cornell Station, and the results published.*

The third factor influencing the composition of the tuber, the variety of seed, was not studied systematically, as the different varieties analyzed were grown on different soils, and no doubt the climatic conditions were different in each case, so no conclusions could be drawn. An investigation is being started this season to study this factor. Quite a number of standard varieties are being grown under the same conditions as to soil and fertilizer at the Purdue Experiment Station farm, on clay loam soil, and also at Ober, in Starke county, on muck soil, on the farm of the Tuesburg Land Company. It is hoped that the chemical analyses of the different

*Cornell Bulletin 230.

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varieties will throw some light upon the question as to which is the most suitable variety for each type of soil.

The fourth factor, the type of soil and its physical condition: Altogether nineteen different samples of potatoes were analyzed, quarter sections of six or seven tubers being taken to prepare each sample. Six samples were grown on a yellow clay loam, five on a black clay loam, one on a black sandy loam, and seven on muck soil. Discarding thirteen of these samples, which were grown with fertilizers, only the six that were grown without fertilizers will be discussed under this head.

Table of food anlyses of potatoes grown on different types of soil:

TABLE NO. II.

Number.	1.	6.	7.	8.	13.	18.
Type of soil	Black loam.	Clay.	Muck.	Light loam.	Muck.	Sand loam.
Variety	Carmen No. 3.	Carmen No. 3.	Carmen No. 3.	Sir Walter Raleigh.	Hundred Fold.	Unknown.
Specific gravity	1.065	1.074	1.075	1.076	1.082	1.065
Moisture	81.29	80.37	80.08	80.20	80.80	81.70
Crude protein	2.97	2.31	2.72	2.72	3.46	2.71
Ether extract	.07	.10	.08	.09	.10	.09
Crude fiber	.47	.50	.43	.58	.50	.50
Crude ash	.93	.93	.80	.87	.55	.86
N. free extract	14.27	15.79	15.89	15.54	14.56	14.14
Prot. N. % total N	47.44	39.67	38.25	49.55	39.79	43.88

The best comparison that can be made from the above table is between Nos. 6 and 7, which are both of the same variety and grown on the same farm. All the factors which might influence the composition of the tubers, except the type of the soil, are the same. Sample tubers of each were placed in water and boiled for one hour. The consensus of opinion was that number 7, grown on muck soil, was fully equal, if not more palatable than number 6, grown on clay. Numbers 6, 7, 8 and 13 cooked up mealy and were of good flavor. Numbers 1 and 18 were soggy and of poor flavor. Potatoes like number 1, on being stored, blackened considerably on cooking. As a rule, the crude protein content of muck-grown potatoes is higher than that of those grown on clay, loam or sandy soils, this being due, no doubt, to the high per cent of nitrogen in such soils. It will be seen, also, that the nitrogen free extract in the potatoes grown on muck compares favorably with that in the others. The specific gravity and moisture content of the different samples do not show any striking variations. Neither does the ether extract, nor crude fiber vary much. The ash content of the muck soil potatoes is much lower than that in the other samples, as would be expected. As the nitrogen free extract is practically all starch no separate starch determinations were made. Quarter sections, cut lengthwise, from several whole potatoes, were weighed, sliced and dried at 100° Centi-

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grade, to get the original moisture. The dried material was ground and analyzed according to the methods adopted by the official agricultural chemists.

Table of fertilizer elements in potatoes grown on different soils:

TABLE 3.

Number.	1.	6.	7.	8.	13.	18.
Type of soil	Black loam.	Light loam.	Muck.	Light loam.	Muck.	Sand loam.
Variety	Carmen No. 3.	Carmen No. 3.	Carmen No. 3.	Sir Walter Raleigh.	Hundred Fold.	Unknown.
N	.48	.37	.43	.44	.55	.43
P_2O_5	.14	.10	.12	.11	.13	.09
K_2O	.49	.51	.44	.48	.32	.51
In ash P_2O_5	15.3	11.1	15.5	11.0	22.9	10.4
K_2O	52.2	54.2	57.5	56.3	58.0	60.5

The nitrogen and phosphoric acid content of the muck soil potatoes is higher than that in the clay and loam soil potatoes, while the potash content is lower. This corresponds fairly well with the nitrogen, phosphoric acid and potash content of the different soils themselves, as the following table would indicate:

Analyses of soils:

TABLE 4.

Number.	1.	6.	7.	8.	13.	18.
Per cent. N	.....	.13	.....	.15	3.13	.38
Per cent. P_2O_5 available*	.....	.007	.....	.006	.038	.008
Per cent. P_2O_5, total	.....	.12	.....	.11	.34	.10
K_2O, total†	.....	2.22	.....	2.12	.30	1.30

No analysis was made of 1 and 7.

*N/5 HCl method of Arthur Coss. †Method of Dr. J. Lawrence Smith.

Advantage was taken of soil improvement work, in which different fertilizers were applied for the purpose of finding what fertilizer would increase the yield of potatoes on the different soils. The following formula was used on each type of soil, at the rate of one thousand pounds per acre, applied in the row below the seed. A sufficient amount of soil was mixed with the fertilizer to keep it from coming in direct contact with the seed and thus injuring the germination and growth.

On one plat 8 per cent available phosphoric acid and 10 per cent potash were applied. On another plat 4 per cent nitrogen, 8 per cent available phosphoric acid and 10 per cent potash; on another plat 4 per cent nitrogen and 10 per cent potash, and on another plat 4 per cent nitro-

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gen and 8 per cent available phosphoric acid were applied. The fertilizers were mixed from dried blood, acid phosphate and sulphate of potash. Three different types of soil were studied as to their fertilizer requirements, a black clay loam, a yellow clay loam and a typical muck soil. The following table gives the yields obtained in bushels per acre, the plats being 1-20 acre each. Every third plat was an unfertilized one, and the yield of the plat marked unfertilized, is an average of three such plats.

TABLE 5.

Fertilizer.	No. of sample.	Black loam.	No. of sample.	Light loam.	No. of sample.	Muck.
Unfertilized	1	42.3	8	171.1	13	63.5
N. P_2O_5, K_2O						
0 8 10	2	87.5	9	230.0	14	194.0
4 8 10	3	90.0	10	233.3	15	182.6
4 0 10	4	58.2	11	189.0	16	139.6
4 8 0	5	60.5	12	193.3	17	58.3

Representative samples were taken from each plat, and analyzed.

Analyses of whole potatoes:

TABLE 6.

Fertilizer All 1,000 Lb. per Acre.						Food Analysis.			
No.	Variety.	Type of Soil.	Fertilizer.			Sp. Gr.	Water.	C. Prot.	Fat.
1	Carmen No. 3	Black loam	0			1.065	81.29	2.97	.07
			N.	P_2O_5,	K_2O				
2	Carmen No. 3	Black loam	0	8	10	1.069	80.16	2.78	.07
3	Carmen No. 3	Black loam	4	8	10	1.066	82.33	3.35	.08
4	Carmen No. 3	Black loam	4	0	10	1.065	80.80	2.65	.08
5	Carmen No. 3	Black loam	4	8	0	1.065	82.65	3.19	.09
6	Carmen No. 3	Light loam		0		1.075	80.37	2.31	.10
7	Carmen No. 3	Muck		0		1.075	80.08	2.72	.08
8	Sir Walter Raleigh	Yellow clay		0		1.076	80.20	2.72	.09
9	Sir Walter Raleigh	Yellow clay	0	8	10	1.073	79.51	2.58	.09
10	Sir Walter Raleigh	Yellow clay	4	8	10	1.074	80.16	2.63	.10
11	Sir Walter Raleigh	Yellow clay	4	0	10	1.074	79.75	2.78	.09
12	Sir Walter Raleigh	Yellow clay	4	8	0	1.075	79.61	2.75	.09
13	Hundred Fold	Muck		0		1.082	80.80	3.46	.10
14	Hundred Fold	Muck	0	8	10	1.087	76.80	2.62	.11
15	Hundred Fold	Muck	4	8	10	1.089	77.10	2.91	.11
16	Hundred Fold	Muck	4	0	10	1.088	77.60	2.62	.10
17	Hundred Fold	Muck	4	8	0	1.081	78.30	3.53	.12
18	Unknown	Black sand		0		1.065	81.70	2.71	.09
19	Rural New York	Muck	0	0	10	1.069	81.42	2.69	.09
	Average Nos. 1, 8 and 13			0		1.0743	80.76	3.05	.09
	Average Nos. 2, 9 and 14		0	8	10	1.0763	78.82	2.66	.09
	Average Nos. 3, 10 and 15		4	8	10	1.0763	79.90	2.96	.10
	Average Nos. 4, 11 and 16		4	0	10	1.0757	79.38	2.68	.09
	Average Nos. 5, 12 and 17		4	8	0	1.0737	80.18	3.16	.10
	Average for all					1.070	80.09	2.84	.09

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TABLE 6—Continued.

N. Compounds.						Fertilizer Elements.		
Fiber.	Ash.	N. free Ext.	Amid N.	Alb. N.	A. N. % Tot.	Total N.	P_2O_5.	K_2O.
.47	.93	14.27	.25	.23	47.44	.48	.14	.49
.49	1.07	15.43	.25	.19	40.99	.44	.14	.60
.40	1.03	12.71	.33	.21	39.41	.54	.21	.57
.51	.87	15.09	.24	.18	42.09	.42	.14	.53
.47	.88	12.72	.33	.18	34.83	.51	.16	.46
.50	.93	15.79	.22	.15	39.67	.37	.10	.51
.43	.80	15.89	.27	.16	38.25	.43	.12	.44
.58	.87	15.54	.22	.22	49.55	.44	.11	.48
.53	.94	16.35	.19	.22	54.45	.41	.14	.56
.53	.94	15.64	.24	.18	44.13	.42	.11	.59
.55	.86	15.97	.24	.21	47.73	.45	.10	.47
.53	.88	16.14	.23	.21	48.37	.44	.12	.49
.50	.55	14.56	.33	.22	39.79	.55	.13	.32
.57	.74	19.16	23	.19	46.41	.42	.13	.40
.54	.81	18.53	.23	.24	51.47	.47	.14	.44
.57	.94	18.15	.21	.21	50.53	.42	.15	.50
.53	.73	16.79	.30	.27	48.28	.57	.18	.34
.50	.86	14.14	.24	.19	43.88	.43	.09	.51
.47	.78	14.55	.24	.19	44.64	.43	.18	.45
.51	.78	14.79	.27	.22	45.59	.49	.13	.43
.53	.91	16.93	.22	.20	47.28	.42	.14	.52
.49	.93	15.53	.27	.21	45.00	.48	.15	.53
.51	.89	16.29	.23	.20	46.78	.43	.13	.50
.51	.83	15.15	.29	.22	43.83	.51	.15	.42
.51	.86	15.56	.248	.202	44.84	.45	.14	.48

Analyses of potatoes figured to dry basis:

TABLE 7.

No.	Variety.	Type of Soil.	Fertilizer.			County.	Food Analysis.		
			N.	P_2O_5,	K_2O		C. Prot.	Fat.	Fiber.
1	Carmen No. 3	Black loam		0		Tippecanoe	15.94	.36	2.46
2	Carmen No. 3	Black loam	0	8	10	Tippecanoe	13.87	.37	2.47
3	Carmen No. 3	Black loam	4	8	10	Tippecanoe	19.19	.45	2.23
4	Carmen No. 3	Black loam	4	0	10	Tippecanoe	13.71	.45	2.69
5	Carmen No. 3	Black loam	4	8	0	Tippecanoe	18.12	.52	2.69
6	Carmen No. 3	Yellow clay		0		Henry	11.81	.49	2.48
7	Carmen No. 3	Muck		0		Henry	13.56	.41	2.16
8	Sir Walter Raleigh	Yellow clay		0		Delaware	13.75	.45	2.91
9	Sir Walter Raleigh	Yellow clay	0	8	10	Delaware	12.62	.44	2.60
10	Sir Walter Raleigh	Yellow clay	4	8	10	Delaware	13.21	.53	2.63
11	Sir Walter Raleigh	Yellow clay	4	0	10	Delaware	13.75	.45	2.70
12	Sir Walter Raleigh	Yellow clay	4	8	0	Delaware	13.44	.46	2.58
13	Hundred Fold	Muck		0		Starke	18.06	.51	2.60
14	Hundred Fold	Muck	0	8	10	Starke	11.31	.46	2.44
15	Hundred Fold	Muck	4	8	10	Starke	12.75	.46	2.33
16	Hundred Fold	Muck	4	0	10	Starke	11.65	.46	2.55
17	Hundred Fold	Muck	4	8	0	Starke	16.31	.53	2.42
18	Unknown	Black sand		0		Starke	14.81	.46	2.74
19	Rural New York	Muck	0	0	10	Tippecanoe	14.56	.46	2.54
	Average Nos. 1, 8 and 13			0			15.92	.44	2.66
	Average Nos. 2, 9 and 14		0	8	10		12.60	.42	2.50
	Average Nos. 3, 10 and 15		4	8	10		15.05	.48	2.40
	Average Nos. 4, 11 and 16		4	0	10		13.04	.45	2.65
	Average Nos. 5, 12 and 17		4	8	0		15.96	.50	2.56
	Average of all						14.34	.46	2.54

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TABDE 7—Continued.

N. Compounds.					Fertilizer Elements.		
Ash.	N. free Ext.	Amid N.	Album. N.	Alb. N. % Total N.	Total N.	P_2O_5.	K_2O.
4.98	76.26	1.34	1.21	47.44	2.55	.76	2.60
5.40	77.89	1.27	.95	40.99	2.22	.72	3.02
5.95	72.18	1.86	1.21	39.41	3.07	1.17	3.24
4.55	78.60	1.28	.93	42.09	2.21	.73	2.77
5.11	73.56	1.89	1.01	34.83	2.90	.94	2.64
4.76	80.46	1.14	.75	39.67	1.89	.53	2.58
4.00	79.87	1.34	.83	38.25	2.17	.62	2.30
4.37	78.52	1.11	1.09	49.55	2.20	.58	2.46
4.59	79.75	.92	1 10	54.45	2.02	.68	2.78
4.70	78.93	1.19	.94	44.13	2.13	.56	2.97
4.25	78.85	1.15	1.05	47.73	2.20	.52	2.32
4.30	79.22	1.11	1.04	48.37	2.15	.59	2.41
2.88	75.95	1.74	1.15	39.79	2.89	.66	1.67
3.19	82.60	.97	.84	46.41	1.81	.54	1.73
3.55	80.91	.99	1.05	51.47	2.04	.62	1.92
4.18	81.16	.93	.95	50.53	1.88	.66	2.22
3.37	77.37	1.35	1.26	48.28	2.61	.85	1.58
4.63	77.36	1.33	1.04	43.88	2.37	.48	2.80
4.18	78.24	1.29	1.04	44.64	2.33	.91	2.40
4.08	76.90	1.40	1.15	45.59	2.55	.67	2.24
4.39	80.09	1.05	.96	47.28	2.01	.65	2.51
4.73	77.34	1.35	1.07	45.00	2.42	.78	2.71
4.33	79.53	1.12	.98	46.78	2.10	.64	2.44
4.26	76.72	1.45	1.10	43.83	2.55	.79	2.21
4.36	78.10	1.27	1.03	44.84	2.30	.69	2.44

It will be seen from these tables that, as a rule, the composition of the potatoes varies the most on those soils which responded in the greatest degree to the different fertilizers. These variations are especially marked in the potatoes grown on muck soil.

The specific gravity was found to be higher, as a rule, where the mineral elements were applied. In each case, however, where nitrogen and phosphoric acid were applied without potash, the specific gravity was lower than that on the unfertilized plats. This might be accounted for in as much as starch is the constituent that generally causes a higher specific gravity in potatoes, and potash is pre-eminently the element that favors the production of starch in the plant. Specific gravity determinations are sometimes taken as a method of estimating starch in potatoes. As will be seen in most cases, the starch has varied with the specific gravity. However, in a number of cases this is not true, and if the specific gravity were taken as an indication of the per cent of starch, the result would be grossly inaccurate.

In most cases the application of either kind of fertilizer decreased the per cent of water in the tuber. This result is in direct contradiction to the conclusions reached in the investigations in Virginia.* This decrease in moisture was most marked in the potatoes grown on muck, amounting in one case to 4 per cent. It might be well to point out that instead of

*Virginia Bulletin No. 92.

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the muck-grown potatoes being found the most watery, that, on the contrary, they contained less water, when fertilized properly, than any of the other potatoes tested. Potash seems to accomplish this to a greater degree than either nitrogen or phosphoric acid. These latter elements appear on some soils and under certain conditions to increase the moisture.

The ether extract content is so small and so unvariable as to be of no interest.

Although the crude fiber varies quite a little in the different samples, fertilizers, either in general or particular, do not seem to affect it in any systematic way.

The ash elements in the potatoes are appreciably increased by fertilizers, especially potash. As potash in almost every case composes more than 50 per cent of the total ash, this is not to be wondered at. It is peculiar, however, that in every instance nitrogen has caused an increase in the ash content, as the potatoes grown with a complete fertilizer are of higher ash content than those grown with phosphate and potash alone.

The nitrogen free extract, which is principally starch, in potatoes, is, in nearly every instance, increased by the addition of potash, while, as a rule, both nitrogen and phosphoric acid tend to decrease it.

An average of the three samples which were fertilized with nitrogen and phosphorus, without the potash, shows an even lower per cent of carbohydrates than the unfertilized samples, when figured to the dry basis. It should be noted that the greater increases of starch from the use of potash, are on the muck soils, which are notably deficient in potash, while on soils which are abundantly supplied with potash, the depressing effect of the nitrogen and phosphoric acid seems to overcome the beneficial effect of the potash fertilizer in the formation of starch.

The crude protein does not vary much with the different fertilizers. It seems, however, that potash tends to lower it. The crude protein of potatoes is, as a rule, less than one-half true proteids. The larger portions of the nitrogenous compounds being amides and amines. The true proteids vary even less than the amide compounds. No attempt was made to study the blackening of potatoes on cooking, said by some, as previously noted, to be due to the composition of the nitrogenous compounds.

No great variation in the phosphoric acid content could be detected from the different fertilizers. The per cent of phosphoric acid in the ash, however, was markedly higher in the sample grown without potash. but with nitrogen and phosphorous.

Slightly greater variations could be noticed as to the potash content. Each of the samples that were taken from the plats, treated with a fertilizer containing potash, was distinctly higher in that element.

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Several plats have been selected in different parts of the state to carry on this investigation with fertilizers on potatoes the coming season. The effect of muriate of potash will be compared with that of sulphate of potash; also nitrate of soda and dried blood will be compared. Several types of soil will be compared, the variety of seed and the composition of the fertilizer being a constant factor, and, as previously mentioned, several standard varieties will be tested as to their chemical composition.

CONCLUSIONS.

First.—Perhaps the most important conclusion reached was that it is possible to grow potatoes of good composition and cooking quality on muck soils. This may be due, partly, to the variety, but, at any rate, the muck-grown potatoes, tested here this year, were in nowise inferior to the other potatoes. If anything, they proved to be of better quality. No attempt, however, was made to test their keeping qualities in storage.

Second.—The Sp. Gr. method for determining starch in the different samples of potatoes tested here, would in many cases be so unreliable as to be misleading.

Third.—The application of fertilizers affects the composition of potatoes, both in the food constituents and in the ash elements. This is more marked on soils which show a large response in increased production on the application of fertilizers.

Fourth.—Potash seems to affect the composition of the tuber more markedly than either nitrogen or phosphoric acid, or even both combined.

President Swaim—Is there anything in the way of miscellaneous business?

Mr. Houston—I would like to ask in regard to the standard sizes of boxes of berries raised in Indiana. I have found that the boxes that strawberries are sold in are not standard quarts, and sometimes I wonder if the majority of these men know that there are two kinds of quarts?

President Swaim—Yes, they do.

Mr. Houston—It seems that a great many do not or else they do not practice what they know. I think I found that there was about twenty per cent. difference between what the boxes should contain and what they do.

President Swaim—I think that the growers here understand the difference between the two measures. There are about ten cubic inches of difference in the two measures.

Mr. Snodgrass—In regard to the two different measures, I think that you will find in most of the catalogues that box factories tell you that they

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will send the dry quart unless the other is wanted. Now I think it is up to the gardener himself as to what kind of a quart he uses. In our locality I do not know of anyone that is using the short quart, and I think we give good satisfaction. We think it is the best advertisement for us. We have to spend a certain amount of money in advertising and the honest quart seems to be the best advertising that we can do.

Mr. Houston—I have not been able to find a dry quart among a southern shipment. If they were all like the gentleman that has just spoken I suppose there would be no need of this talk.

President Swaim—The question should not be so much as to what the box holds, but that it should be uniform. If there is nothing further along this line we will stand adjourned sine die.

The meeting stood adjourned.

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Proceedings

OF THE

FORTY-SEVENTH ANNUAL MEETING

OF THE

INDIANA STATE HORTICULTURAL SOCIETY.

FIRST SESSION.

The forty-seventh annual meeting of the Indiana Horticultural Society met in Rooms 11 and 12, State House, Indianapolis, Indiana, on the afternoon of Wednesday, December 4, 1907, and President Swaim was in the chair, who said:

The time is now here for us to call the forty-seventh annual meeting of this society to order. We will begin with the usual invocation of God's blessings upon us, led by Bro. Carver.

Rev. J. W. Carver—Our Divine Father, we have assembled here from different homes and different parts of this state to meet in this convention, and before entering upon its duties and work we are asking that Thou wilt be with us in these deliberations, and may our every thought and word be with the realization that every good and perfect gift cometh from Thy hand.

Heavenly Father, we thank Thee for the bounties of nature that have come to us; we thank Thee for life, and we thank Thee for a free country, a rich and productive soil, with all the attending blessings, and we recognize that in the past season we have received at Thy hands many rich gifts and we wish to thank Thee for them.

Our Father, we ask Thee now to lead and direct us in the deliberations of this body, and in the talks that are for the upbuilding of this material life; and also, while we are doing this, may we not forget that we are spiritual beings and that we have our spiritual life to look after. Bless every one present, and remember those who have had to remain at home.

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Guide and direct us all through life, and in heaven finally save us. We ask it all in the name of Christ, our blessed Redeemer. Amen.

President Swaim—Vice-President Reed will please take the chair.

Vice-President Reed—The first thing on the programme this afternoon is the annual address of our president.

PRESIDENT'S ADDRESS.

H. H. Swaim—Ladies and Gentlemen: Indiana is a great agricultural state, yielding annually immense crops of produce of the finest quality. Her stock, her corn, her fruit and her men have all taken the highest rank when brought into competition with the world. We are all justly proud to claim a home within her borders. We rejoice in her greatness. But while we rejoice we cannot fail to see undeveloped opportunities. Many farms are not producing all they are capable of doing; much stock is not cared for in such a manner as to reach the highest development. Orchards and fruit plantations are not always given the necessary care to secure the most profitable results. But the tendency is to improve. The work of Purdue Experiment Station, of the Farmers' Institutes, of the Indiana Horticultural and all kindred societies is having a wholesome effect, and I appeal to all to unite in a continued effort for a greater Indiana.

The year 1907 will long be remembered by Indiana fruit growers as an unfruitful year. Fruit of all kinds was the nearest a complete failure in all parts of the state it has been for many years, due primarily to adverse climatic conditions. Exceptionally warm weather during March forced the fruit buds, even to full bloom in some sections of the state. This was followed by a series of frosts and freezes and cold rains which brought disaster to the fruit crop. Prior to this the extreme northern part of the state had already been devastated by the freeze of October 10, 1906; there came without warning a severe frost, while the trees were in full leaf and the wood full of sap, resulting in the destruction of many young, thrifty growing trees and serious damage to all.

Although the crop of fruit was a practical failure, the season was fruitful with lessons for the horticulturist. The isolated cases where partial crops of fruit were secured, are well worth investigating, to learn, if possible, the cause for success amidst a general failure.

A careful study of the conditions in these orchards, reveals the fact that success came only to orchards which had the best of care, which were systematically sprayed, pruned and fed, and thus the vitality of the trees were kept to the highest point. The elevation of the orchard was clearly shown to be an important factor, and in some instances an effective wind break must be given a portion of the credit. What is true of the tree fruits

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is equally true of the small fruits—those which had nearest the ideal conditions survived best the severe weather. Thus a careful study of the condition and treatment of these successful orchards and fruit plantations emphasizes the necessity of always maintaining the highest possible vitality of our trees and teaches valuable lessons which may more than recompense us for the loss of the crop.

Another good result of the untoward season has been in lessening the ravages of many of our insect foes, in some cases by starvation, even the San Jose scale not having shown its usual aggressive activity.

The work of this society in spreading the gospel of good fruit is beginning to show results in the many young orchards being planted and an increasing interest throughout the state in the fruit industry. If this work is continued it must eventually redound to the credit of the Indiana Horticultural Society. The recent trip through the southern part of the state—the future fruit garden of Indiana—made in co-operation with Purdue University Experiment Station, showed an eager interest among the people of that section to learn up-to-date methods of cultivation and the principles of practical fruit culture, which augurs well for the rapid development of that section.

In this connection I wish to express the hearty appreciation, by our party, of the hospitable entertainment given us by the Baltimore & Ohio Southwestern Railroad, and wish for them a bountiful return for their liberality.

The co-operation of this society with Purdue Experiment Station in horticultural work is to be commended, and we earnestly hope for its continuance, which can result only in good. Another avenue for good work has opened through the invitation from Purdue University to exhibit our products and attend the lectures at the Farmers' Short Course, an opportunity to which we should heartily respond.

I urge the continuance of the demonstration work begun by this society in 1906, as a most practical means of teaching better methods in horticultural work and of encouraging the planting of fruit in sections to which it is best adapted.

I wish to commend our legislative committee for the efficient manner in which it performed its duties, which were made especially arduous and unpleasant at the last legislative session.

In the past our district committeemen have not been as prompt in making their reports as the best interests of the society demands. The purpose of this committee is to widen our influence and increase our knowledge of horticultural conditions in the state, and it is due to the society that they make prompt and complete reports as outlined by the secretary. The state horticultural societies of the central western states all hold their

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annual meetings upon practically the same dates, making it inconvenient for residents of one state to attend the meetings of adjoining states, and frequently impossible to obtain lecturers from other states on account of duty to their home society. With a view of remedying this condition your secretary and president have addressed each of the societies of Wisconsin, Illinois, Michigan and Ohio, suggesting the propriety of forming a circuit of these states, whereby we would be better able to secure instructors from adjoining states for these meetings and to employ the best talent in the country for the entire circuit, as well as leaving every one free to attend any or all of the meetings on the circuit. We have suggested to these states the appointment of a committee from each society to meet at some central point and perfect the arrangements, if possible, for such a union. I trust that this action will be upheld by this society and provision made for such a committee, with power to act, in case we meet with a favorable response from the above-mentioned states.

In conclusion, I entreat you to unite in such a vigorous and harmonious campaign for the advancement of the horticultural interests of the state as will in the near future place Indiana where she belongs among the great horticultural states of the nation.

(Applause).

Vice-President Reed—It is usually customary to refer the president's address to a committee. I will appoint on that committee Messrs. C. M. Hobbs, W. H. Ragan and J. J. Milhous.

(President Swaim again in the chair.)

President Swaim—We will now listen to the report of the secretary, W. B. Flick.

Secretary Flick—I have the honor to submit the following report of the finances of the society:

REPORT OF W. B. FLICK, SECRETARY INDIANA HORTICULTURAL SOCIETY.

In account with State:

Dec. 3, 1907.

Receipts.

1906.		
Oct. 31.	Balance on hands	$299 79
Nov. 1.	Received appropriation from State	2,600 00
	Total receipts	$2,899 79
	Total disbursements	2,123 55
	Returned to state treasurer*	$776 24
	Balance on hand	None

*By the ruling of the Auditor of State, Mr. Billheimer, the balance unexpended was returned to the State.

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Disbursements.

1906.			
Dec.	6.	W. H. Ragan, expenses as lecturer	$50 00
"	6.	J. C. Grossman, expenses, Committee on Horticulture	13 60
"	6.	L. B. Custer, expenses, Committee on Horticulture	3 85
"	6.	D. E. Hoffman, expenses, Committee of Horticulture	5 00
"	6.	J. J. Milhous, expenses, Committee on Horticulture	1 50
"	6.	Elmer G. Tufts, expenses, Committee on Horticulture	7 70
"	6.	Chas. N. Lindley, expenses, Committee on Horticulture	16 60
"	6.	J. N. Snodgrass, expenses, Committee on Horticulture	3 25
"	6.	A. W. Shoemaker, expenses, Committee on Horticulture	1 40
"	6.	W. J. Ritterskamp, expenses, Committee on Horticulture	8 50
"	6.	H. H. Swaim, President, expenses, Board of Horticulture	13 50
"	6.	Jas. Troop, expenses, Executive Committee	5 65
"	6.	H. M. Stout, expenses as expert judge	4 60
"	6.	Jos. A. Burton, expenses as superintendent experiment orchard	5 10
"	6.	Evan Swift, expenses as expert judge	1 50
"	6.	Walter S. Ratliff, expenses, Executive Committee	5 00
"	6.	E. Y. Teas, expenses, Executive Committee	4 25
"	6.	W. C. Reed, expenses, Board of Horticulture	9 50
"	6.	S. A. Hazelett, bills paid as per memorandum	213 65
Feb.	4.	W. B. Flick, Secretary, first quarter salary	225 00
"	4.	Joe A. Burton, superintendent experiment orchard, salary, first quarter	62 50
"	4.	H. H. Swaim, President, expenses on Board of Horticulture	10 00
"	4.	W. C. Reed, Vice-President, expenses on Board of Horticulture	16 25
"	4.	S. A. Hazelett, Treasurer, expenses on Board of Horticulture, and bond	20 25
"	4.	Jas. Troop, Executive Committee, expenses on Board of Horticulture	3 50
"	4.	E. Y. Teas, Executive Committee, expenses on Board of Horticulture	3 75
"	4.	Joe A. Burton, superintendent experimental orchard, expense	6 45
"	21.	Mrs. Ella Shera Green, reporting annual meeting	50 00
"	21.	J. W. Moorehouse, expense as lecturer	7 20
May	13.	W. B. Flick, Secretary, second quarter salary	225 00
"	13.	Joe A. Burton, superintendent experiment orchard, salary, second quarter	62 50

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1906.		*Disbursements*—Continued.	
Aug.	8.	J. C. Grossman, expenses, Committee on Horticulture...	$8 73
"	8.	Elmer G. Tufts, expenses, Committee on Horticulture..	8 40
"	8.	Chas. N. Lindley, expenses, Committee on Horticulture..	9 68
"	8.	F. A. Forbes, expenses, Committee on Horticulture....	6 89
"	8.	A. W. Shoemaker, expenses, Committee on Horticulture.	6 25
"	8.	J. J. Milhous, expenses, Committee on Horticulture....	5 90
"	8.	J. M. Snodgrass, expenses, Committee on Horticulture..	4 15
"	8.	L. B. Custer, expenses, Committee on Horticulture.....	4 80
"	8.	E. Y. Teas, expenses, Executive Committee.....	8 70
"	8.	Walter S. Ratliff, expenses, Executive Committee.....	6 15
"	8.	J. Troop, expenses, Executive Committee.....	7 50
"	8.	W. B. Flick, Secretary, postage and office expenses, as per memorandum	53 67
"	8.	Sentinel Printing Company, printing and office supplies.	157 90
"	8.	G. C. Dickson, clerk, expenses at summer meeting.....	5 25
"	8.	W. B. Flick, Secretary, expenses at summer meeting....	5 50
"	8.	C. M. Hobbs, expenses, Legislative Committee and director experiment orchard.....	19 00
"	8.	Sylvester Johnson, expenses at summer meeting.....	2 50
"	8.	Mrs. M. J. Ferguson, expenses as lecturer, summer meeting	7 88
"	8.	Mrs. L. E. Deal, expenses as lecturer, summer meeting.	7 49
"	8.	Jas. M. Carver, expenses as lecturer, summer meeting..	2 40
"	8.	Prof. W. J. Green, expenses as expert judge.....	3 00
"	8.	H. H. Swaim, President, expenses, Board of Horticulture	9 50
"	8.	S. H. Hazelett, Treasurer, expenses, Board of Horticulture	6 00
"	9.	W. B. Flick, Secretary, salary, third quarter.....	225 00
"	9.	Joe A. Burton, superintendent experiment orchard, salary, third quarter	62 50
"	9.	T. A. Coleman, expenses, Joint Legislative Committee..	14 00
"	30.	Jas. Troop, expenses as member Executive Committee and director experiment orchard.....	8 25
"	30.	E. Y. Teas, expenses as member Executive Committee..	9 00
"	30.	H. H. Swaim, President, expenses as member Board of Horticulture	12 85
"	30.	S. H. Hazelett, Treasurer, expenses as member Board of Horticulture	6 32
"	30.	Walter S. Ratliff, expenses as member Executive Committee	9 20

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1906.	*Disbursements*—Continued.	
Aug. 30.	W. B. Flick, Secretary, expenses as per memorandum..	$26 85
" 30.	C. M. Hobbs, expenses as director experiment orchard..	5 25
" 30.	Mrs. Ella Shera Green, reporting summer meeting.....	30 75
" 30.	S. A. Hazelett, Treasurer, premiums paid at summer meeting	33 50
" 30.	W. J. Ritterskamp, expenses Committee on Horticulture	11 45
Sept. 30.	R. V. Simpson, expenses as director, experiment orchard	8 70
" 30.	W. B. Flick, Secretary, postage.....	38 50
" 30.	Sentinel Printing Company, printing and office supplies.	6 30
" 30.	W. B. Flick, Secretary, salary for August and September, 1907	150 00
" 30.	Joe A. Burton, superintendent experiment orchard, salary, August and September.....	41 34
		$2,123 55

In account with the society:

1906.		
Oct. 31.	Balance on hands.....	$237 00
1907.		
Oct. 1.	Received from members—fees and dues.....	60 00
	Total receipts	$297 00
1907.		
	Disbursements, none.	
Oct. 1.	Balance on hands.....	$297 00

Respectfully submitted,

W. B. FLICK, Secretary.

President Swaim—The report of the treasurer will now be read.

Treasurer Hazelett—To the Honorable President and Members of the Indiana Horticultural Society:

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SOCIETY'S FUND, FOR THE PERIOD NOVEMBER 1, 1906, TO NOVEMBER 30, 1907, INCLUSIVE.

Receipts.

1906.		
Nov. 1.	Balance on hand	$149 00
Oct. 31.	Received from Secretary, fees and dues	88 00
1907.		
Nov. 30.	Received from Secretary, fees and dues	60 00
	Total receipts	$297 00

Disbursements none.

Balance on hand 297 00

Respectfully submitted,

SAM'L A. HAZELETT,

Treasurer Indiana Horticultural Society.

Greencastle, Ind. Dec. 4, 1907.

STATE APPROPRIATION.

To the President and Members of the Indiana Horticultural Society:

I hereby submit you my report as treasurer of the Indiana Horticultural Society, for the period November 1, 1906, to September 30, 1907, inclusive:

Receipts.

1906.		
Nov. 1.	Balance on hand	$299 79
" 26.	Received from State Treasurer	2,600 00
	Total receipts	$2,899 79

Disbursements.

War. No.	*Date.*	*Name.*	*Amount.*
	1906.		
232.	Dec. 6.	W. H. Ragan	$50 00
233.	" 6.	J. C. Grossman	13 60
234.	" 6.	H. H. Swaim	13 50
235.	" 6.	L. B. Custer	3 85
236.	" 6,	D. E. Hoffman	5 00
237.	" 6,	Prof. J. Troop	5 65
238.	" 6,	H. M. Stout	4 60
239.	" 6,	J. A. Burton	5 10
240.	" 6,	J. J. Milhous	1 50
241.	" 6,	Evan Swift	1 50

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			Disbursements—Continued.	
	1906.			
242.	Dec.	6,	W. S. Ratliff	$5 00
243.	"	6,	E. Y. Teas	4 25
244.	"	6,	E. G. Tufts	7 70
245.	"	6,	C. N. Lindley	16 60
246.	"	6,	J. M. Snodgrass	3 25
247.	"	6,	W. C. Reed	9 50
248.	"	6,	A. W. Shoemaker	1 40
249.	"	6,	W. J. Ritterskamp	8 50
250.	"	6,	S. A. Hazelett	213 65
	1907.			
251.	Feb.	4,	W. B. Flick	225 00
252.	"	4,	J. A. Burton	62 50
252½.	"	4,	H. H. Swaim	10 00
253.	"	4,	W. C. Reed	16 25
254.	"	4,	S. A. Hazelett	20 25
255.	"	4,	J. Troop	3 50
256.	"	4,	E. Y. Teas	3 75
257.	"	4,	J. A. Burton	6 45
258.	"	21,	J. W. Moorehouse	7 20
259.	"	21,	Ella S. Green	50 00
260.	May	13,	W. B. Flick	225 00
261.	"	13,	J. A. Burton	62 50
262.	Aug.	8,	J. C. Grossman	8 73
263.	"	8,	E. G. Tufts	8 40
264.	"	8,	E. Y. Teas	8 70
265.	"	8,	W. S. Ratliff	6 15
266.	"	8,	W. B. Flick	53 67
267.	"	8,	Sentinel Printing Co.	157 90
268.	"	8,	G. C. Dickson	5 25
269.	"	8,	W. B. Flick	5 50
270.	"	8,	C. M. Hobbs	19 00
271.	"	8,	C. N. Lindley	9 68
272.	"	8,	Prof. Troop	7 50
273.	"	8,	S. Johnson	2 50
274.	"	8,	M. J. Ferguson	7 88
275.	"	8,	Mrs. L. E. Deal	7 49
276.	"	8,	F. A. Forbes	6 89
277.	"	8,	A. W. Shoemaker	6 25
278.	"	8,	J. W. Carver	2 40
279.	"	8,	W. J. Greene	3 00
280.	"	8,	H. H. Swaim	9 50

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	1907.		*Disbursements*—Continued.	
281.	Aug.	8,	S. A. Hazelett	$6 00
282.	"	8,	J. J. Milhous	5 90
283.	"	8,	J. M. Snodgrass	4 15
284.	"	8,	L. B. Custer	4 80
285.	"	9,	W. B. Flick	225 00
286.	"	9,	J. A. Burton	62 50
287.	"	9,	W. B. Flick	14 00
288.	"	30,	J. Troop	8 25
289.	"	30,	E. Y. Teas	9 00
290.	"	30,	H. H. Swaim	12 85
291.	"	30,	W. S. Ratliff	9 20
292.	"	30,	S. A. Hazelett	6 32
293.	"	30,	W. B. Flick	26 85
294.	"	30,	C. M. Hobbs	5 25
295.	"	30,	Ella S. Green	30 75
296.	Sept.	20,	S. A. Hazelett	33 50
297.	Oct.	4,	W. J. Ritterskamp	11 45
298.	Sept.	30,	R. V. Simpson	8 70
299.	"	30,	W. B. Flick	38 50
300.	"	30,	Sentinel Printing Co.	6 30
301.	"	30,	W. B. Flick	150 00
302.	"	30,	J. A. Burton	41 34
	Nov	30,	Balance, to state treasurer	776 24
			Total disbursements	$2,899 79
	Nov.	30,	Total receipts	$2,899 79
	"		Total disbursements	2,899 79

Respectfully submitted,

SAMUEL A. HAZELETT.

Treasurer Indiana Horticultural Society.

Greencastle, Ind., Dec. 4, 1907.

STATE OF INDIANA. $776.24

OFFICE AUDITOR OF STATE

Indianapolis, Ind., Dec. 2, 1907.

Received of James A. Hazelett, Treasurer, seven hundred seventy-six and 24-100 dollars, on account of Balance Horticultural funds, 1907, refunded to treasury.

J. C. BILLHEIMER,

Auditor of State.

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President Swaim—These reports are referred to the Finance committee for verification. You will note that in these reports there was something said about a certain amount of our appropriation being turned back into the state treasury. This is the first time that we have ever been compelled to this, but under the ruling of our present auditor it became necessary for us to do this. I understand that there can be no appeal from the decision of the auditor, so that we will have to abide by it. Under the circumstances we are fortunate in having a fund of our own intact other than that which comes from the state.

C. M. Hobbs—I would like to ask if this Society and the State Board of Agriculture are organized on the same basis? I would also like to know if the State Board of Agriculture is required to spend its money in the same manner. Several years ago I consulted the attorney general and he said that in his opinion the state had no jurisdiction over this affair, as the appropriation was for us to use as we saw fit, and I would like to know if there is a conflict of authority, or whether the attorney general is the one to determine this or whether the auditor of state is superior; or perhaps the attorney general has changed his mind.

President Swaim—I am informed that the decision of the auditor is final in the matter.

Secretary Flick—We have investigated the matter as well as we could and found that the attorney general had instructed the auditor as to his position in the matter, and we found out that the only difference between this society and the agricultural society is that they spend all of their money and we don't. We could have spent more very profitably in demonstration work, but were prevented by unavoidable delays.

Mr. Hobbs—The point I wish to make is this: Is the State Board of Agriculture required to spend their money before they can get it?

Secretary Flick—Yes, sir. They have to file receipted bills with the auditor before they can draw their appropriation.

Mr. Hobbs—They have to present their bill of expenses to the auditor before they are reimbursed?

Secretary Flick—Yes, they are allowed ten thousand dollars a year for premiums and they spend ten thousand dollars for that purpose. We did not spend all of our appropriation, and it reverts back to the state, and if they did not spend all of theirs it would go back to the state, too.

We could have spent all of our appropriation, perhaps, but it has been the Society's custom to economize where it could be done without crippling

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the work, and I know that the Society would rather have money to turn back and saved for the state than lay themselves liable to be called wasteful.

Treasurer Hazelett—I do not think it is to our discredit to be able to turn some of the mony back to the state, and the auditor complimented us very nicely for being able to do so. I do not think it is any disgrace at all for us to have had this left.

President Swaim—The next thing on the program is the report of the superintendent of our experimental orchard.

REPORT ON EXPERIMENTAL ORCHARD.

JOE A. BURTON, SUPERINTENDENT.

The crop of fruit this year was very irregular. This was largely due to the killing frosts and freezes in April. In the variety plat a few trees showed up grandly. Prominent among these was Florence crab. As reported heretofore, this is surely the most beautiful of apples. It has white ground beautifully calicoed with flashy red. It is an early and abundant bearer. Tree spreading and quite dwarfish. In quality it is the peer of any of the summer crabs.

Kinnard is a nice spreading tree. It bore a full crop of dark red, even-sized, high quality apples. They are a little larger than Winesap, and tree much better. It is surely very promising.

Summer Rambo gave a very full crop. It resembles fall Rambo in appearance and taste, though smaller and sweeter. It ripens in August. If it had more size I would consider it very valuable.

McMahan is a large white August apple, good bearer, but very sour. It is a favorite with the curculio.

Morgan's White is a large and white apple of fair quality, but much inclined to rot. Blushra crab bears abundantly, but is dull in appearance and of very poor quality.

Winesap, as might be expected, behaved grandly. Akin is more beautiful and of better quality than Winesap, and bears as well, or better. It is just the opposite of Winesap in tree, being an extremely upright grower. The fruit is not so uniform as Winesap; sometimes rather small.

Rome Beauty is growing in thin soil and is maintaining its characteristic for pouting under such conditions. It bears well only in rich soil.

Among tap-worked trees we have a number of seedlings and several varieties sent in by different parties for testing. Among the latter is a seedling from Horace Flora of Harrison County. He thought it was very valuable. It proves to be a large, white August apple with tough skin and good quality. Though white, I think it would ship well, as we have

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no good dessert apple ripening at that season. I think it can well be recommended. I wrote Mr. Flora asking his desires in regard to introducing it. My letter was remailed over the country and finally returned. As Mr. Flora cannot be found it falls to the Horticultural Society to introduce it. I suggest that it be called "Corydon."

A pedigreed seedling, Genet, pollenized by Ben Davis, is very promising. It is like Genet in every way except size and time of ripening. Imagine an overgrown Genet ripe in August and you have it. An appropriate name would be "Ben-et."

Among these top-worked trees are several very fine sweet apples. These were selected and top-worked because of their promising appearance. I might remark here that nearly all the seedlings pointed by different horticulturists as the most promising and such as recommended by Luther Burbank, have turned out to be sweet. Why sweet apples should be more robust and hardy than sour ones is a mystery. We observed one Ben Davis seedling during the April freezes carried its leaves uninjured, while those about it were all killed. It proved to be sweet.

Of the seedlings on their own roots about 240 bore; some more abundantly than I ever saw before. Some were so loaded that the apples were crowded along the limbs like Burbank plums. Winesap seedlings have led in the early bearing; also in producing the most promising varieties. Rome Beauty gave one very promising variety, good size, white ground with red cheek and very aromatic flavor. It ripens in August. It may be just what we need for that appleless season. Winesap gave one small red August apple of most excellent flavor. These two and the Genet-Ben Davis were sent by request to the Pomologist, Colonel Brackett. Here is his reply:

UNITED STATES DEPARTMENT OF AGRICULTURE.

BUREAU OF PLANT INDUSTRY.

Pomological Collections.

October 12, 1907.

Mr. Joe A. Burton, Orleans, Ind.:

Dear Sir—Replying to yours of the 16th ultimo in regard to the three varieties of apples which you sent here for examination, namely, Rome Beauty Seedling, Genet-Ben Davis, and seedling of Winesap, I will say that the Rome Beauty was so far decayed that it was impossible to get a section of it or to judge of its quality. The result of the Genet-Ben Davis was in fine condition and I have a good description of it for placing on file in this office. In quality it was found to be from good to very good. But I could trace no suggestion of Ben Davis, but the Genet cropped out quite conspicuously. The Winesap seedling was found to be very good. I

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also have a good description of this new variety. These two new candidates for public favor should be given further trial and tested in other localities to ascertain adaptability to various soils and climate.

I notice in the papers that you have been getting $5.50 per barrel for Grimes Golden. This, I am sure, will place your fruit at the highest notch. You can perhaps produce a better quality of this variety than most any one else. I remember the specimens you exhibited at the American Pomological Society at Kansas City, where they attracted so much attention.

Please accept many thanks for the privilege of examining these new fruits. Yours, very truly,

G. B. BRACKET.

From Winesap we also have a small golden yellow apple of same color through and through and sweet as sugar. Winesap also gives almost a reproduction of Grimes, a little smaller, later and sweeter. We cannot notice all the promising ones, but with the valuable assistance of Prof. Woodbury we have selected and marked for further trial 140 trees, viz.; Grimes, 6; Ben Davis, 20; Salome, 2; Rome Beauty, 20; Winesap, 72; Kansas Keeper, 8; Mann, 1; Grimes and Winesap intermingled, 13; unknown, 1. Prof. Woodbury carefully took a scientific description of each tree and specimens of apples. Afterward, in his office, he photographed and analyzed each variety. This required an immense amount of work on his part. We also marked for destruction ninety trees. All the seedlings supposed to be large enough to bear have been girdled to force them into bearing. This was done by cutting through the bark with a common drawing knife about June 20.

Our plan is to carefully weigh the merits of each seedling and unless it shows some qualities superior to that of well-known varieties, cut it down. They are now growing under very unfavorable conditions in nursery rows, nine feet wide, three to four feet in the row. We cannot get among them to spray; neither has the fruit opportunity to develop in size, color nor quality. It is quite probable that in our haste to thin them out we will destroy some trees that may be of superior merit. About 600 two-year seedlings were transplanted last spring into rows one rod apart and six feet in the row. This will give room to drive along the rows to spray.

Trees top-worked with scions from nursery rows and also from bearing trees continue to say it makes no difference in their bearing whence they come. The croakers had as well drop that fad. The tree treated all at once with enough spraying mixtures for thirty years is still healthy. The entire orchard is now very healthy, save a few trees with root rot.

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FINANCIAL STATEMENT.

Balance on hand from 1906	$20 40
Received for apples	20 50
Received for corn	63 00
Total	$93 90
Expended for labels	1 15
Balance	$92 75

President Swaim—This is certainly a very interesting report and it shows that we will get some remarkable results if we continue the work as outlined. I think possibly some one will want to ask some questions and we will wait a few minutes to give them an opportunity.

Prof. Troop—There is one thing that seems rather peculiar to me and that is that when we were looking over the apples down there the most promising of the Ben Davis seedlings, as I remember, in almost every case, were sweet apples, and I would like to know if Mr. Ragan can tell us where they got their sweet quality. Do you know anything about the parents?

Mr. Ragan—I hadn't noticed this fact, but for a great many years I have known that the Janet, as we have called it, is inclined to produce a large per cent of sweet apples in seedlings. In my father's lifetime he planted a few very fine specimens of Rall's Janet, which were a favorite with us, or to him, rather, being a Kentuckian as he was, and from the five specimens he obtained four trees that came into fruiting and three of these were sweet. Perhaps this a larger per cent than we usually have from seedlings. I am not able to say just what might have been the cause of this feature of reproduction.

Now, then, if it is in order, I would like to say a few words on the report which has just been given. I visited this orchard, which is under the care of Mr. Burton, and which, I understand, is the work of the Society really, a year ago last fall, and spent a couple of days with Mr. Burton and was wonderfully interested in the work that is being done down there. There are prospects of developing valuable varieties indeed. Mr. Burton sent some to Washington, and I had the pleasure, along with Colonel Brackett, of testing them, and they proved superior apples in quality as well as in general appearance, and I think that this society can afford to continue this work. This work properly belongs to the experiment station under government management, but it seems that they have not yet turned their attention to this, but I suppose they will when it is possible. I thought years ago that that would be the leading feature of the experiment station, but it has not, and I do not know of a single

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experiment station under the fostering care of the government that has produced results such as many individuals have. Take Mr. Patton of Iowa and Mr. Gideon of Minnesota, and many others that have done wonders in this line of work. This orchard is exceedingly promising, and Mr. Burton is a connoisseur in this line, and is in a fair way to produce valuable new varieties.

My father has said that he knew of no new varieties that were superior in quality to many of the old. He saw the Spitzenburg, and the Yellow Belle Flower and the Yellow Newton Pippin, and it was very rarely that any new varieties exceeded these old-time ones. Nothing could surpass the Newton or the Spitzenburg, unless it might have been the Grimes, which is of comparatively recent origin, since the days of the Jonathan, which is a seedling of the Spitzenburg. It seems that away back in the early history of the pomological development of this country some of the newer varieties were developed which have been good to date. While quality is and should be the leading feature, there are other characteristics which go along with it to form a combination with good quality that makes a variety worthy of propagation. It must be a good, healthy tree, and have good bearing qualities, etc. Well, these are the things which we have been trying to find for years. Take the Ben Davis, which swept the country. While it is inferior in quality it has been one of the most profitable apples that has appeared within the last fifty years in experimental work, and they came upon it by accident. No one even knows the real history of the Ben Davis.

I would like to say that I approve very heartily of what Mr. Burton is doing for the Society and perhaps our children or our grandchildren may find that he has accomplished something exceedingly valuable.

Prof. Troop—I want to call attention to another point which seems to me to be of a great deal of value in this report, and that is in regard to the relative value of scions cut from bearing and from nursery-grown trees. I am frequently asked the question by people, not only of this state, but of other states as well, as to which is preferable, scions cut from trees that are grown and bearing, or those cut from the nursery row. Of course, every one knows large nurserymen have to cut their scions from nursery-grown trees, because they could not get enough from bearing trees, and it seems that this question has been pretty well settled from experiments that have been carried on by Mr. Burton in this orchard, which seem to prove that there is not any particular difference whether the scions come from one place or another, just so they come from a good, healthy tree. A good many are advocates—I do not want to reflect on any man at all—but a good many people have an idea that because a tree has been

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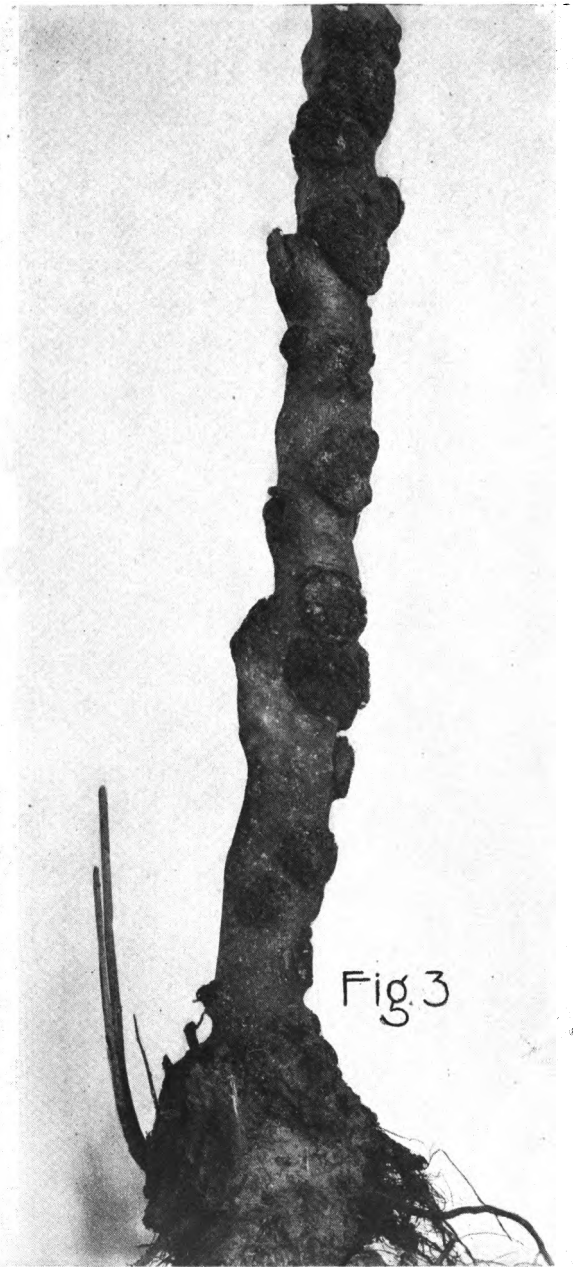

PHOTO BY PROF. C. G. WOODBURY, PURDUE UNIVERSITY.

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propagated from nursery rows for a series of years or generations that it must have an effect on the time of bearing. That is, that the tendency will be for them to take longer to come into bearing, but our experience does not indicate that.

President Swaim—Possibly we have devoted as much time to this subject as we should at this time, but if someone has a short question to ask we will wait a moment and if any one has something important to offer we will listen to it. If not we will have the next topic on the program, which is:

SOME THINGS THE STATE ENTOMOLOGIST WILL ENDEAVOR TO DO FOR THE HORTICULTURAL INTERESTS OF THE STATE.

BY BENJAMIN DOUGLASS, STATE ENTOMOLOGIST, INDIANAPOLIS.

Mr. Douglass—I am certainly glad to have this opportunity of getting in touch with the men who are growing fruit in the State of Indiana. During the last summer I have been in touch with men who are growing nursery stock in Indiana, and I think we have come to understand each other pretty well, but with the fruit growers, the apple growers, I am as yet unacquainted, and, as I have said, I am glad to have this opportunity of meeting the most prominent men in this branch of this great industry, and of having the privilege of talking with you and of telling you of some of the things which I have outlined to do, and suggesting, in a way, how we propose to do it.

I do not know of any way in which I can make my talk plainer than to briefly outline what the work of the state entomolgist is. Of course, in years past, since we have had the nursery inspection law, there has not been a sufficient appropriation to enable the state entomoligst to really do any very serious work along any line that naturally falls to that office, and for that reason it is not surprising that the work has progressed more in this season than it has in some other seasons, simply owing to the lack of an appropriation in the years gone by.

Briefly, there are six divisions of the work for the state entomologist, six branches of work for him to follow out. In the first place, the most important work, and the work that is specified under the law as the specific work for the state entomologist, is the nursery inspection work and I think you all understand what that means, and what it amounts to.

In the second division is the inspection of private orchards and private grounds of any sort wherever fruit trees are grown.

In the third division is the work of the enforcement of the law in both of these branches of inspection work.

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Fourth, to study new fruit pests, both of insect and fungus character, for under the state law of Indiana, at least, the entomologist must know a great deal of botany as well as entomology.

The fifth and sixth divisions are both of an educational nature, in regard to the issuing of bulletins and talks of an educational nature before the Farmers' Institutes, or wherever we can get together a handful of people interested in fruit growing.

When we started to work there were some one hundred and sixty nurseries in the state and the information relative to these nurseries was rather meagre to start with, but we finally visited most of them. There are one or two I have yet to see. Out of the one hundred and sixty-three nurseries listed we have granted one hundred and five or six certificates for the sale of stock. Now for those that have not received certificates, part have gone out of business, and there are a number that have been forced out of business owing to the condition in which their premises have been found. A little over thirty of the nurseries have shown San Jose scale on their premises and have had to take proper measures in order to get rid of it. Some of these were small places and were badly infested and preferred to go out of business rather than do the necessary work in order to get a certificate. Some have been required to fumigate their stock that is to be sent out. In these cases it seemed that it was apparently safe to sell stock from their grounds.

In addition to the inspection for San Jose scale the work has included a great many other things, such as scurfy scale and the other members of the genus to which the San Jose scale belongs, and quite a number of fungus diseases which I cannot mention here. The nurserymen, for the most part, have shown a disposition to co-operate with me and my department in enforcing the nursery law, and I believe that I have got what I have been working for all summer, and that is the approval and co-operation of the nurserymen of Indiana. It is only by having the co-operation of the people with whom I am working that I can make a success of this office that I have taken hold of. Now that I have the approval and co-operation of the nurserymen of the state, I am going after the support and co-operation of the men who are growing apples—the fruit growers of the state.

Nursery inspections have just about closed, and they have extended later this year than before because it has been a "one-man job," and heretofore nursery inspection has been done by deputies to a certain extent. It has usually been completed by the first of October, as is required by the law, but this year the law has required the state entomologist to make all the inspections personally, and that has required very close work on my part, and certainly this has been a very active summer for me, as I have also had to look after the organization of the office.

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Now, in regard to the inspection of the private orchards. As yet we have not had time to take this up, except incidentally. Of course, in my work this summer I have gone over a great many orchards, but only in a casual way, not in a systematic manner, and there has been no real work of that kind done, and probably will not be done for at least another month, as there is a great deal of other work that has to be attended to before this work can properly be taken up.

Now, in regard to the enforcement of the nursery law, the entomologist is decidedly handicapped at the present time owing to the lack of an appropriation for the employment of deputies for the different sections of the state. It is simply impossible for one man to keep track of what is going on over a state the size of Indiana and properly enforce the nursery law, and it is necessary that there should be a large appropriation for that work. Some people do not require to be watched at all, and others require watching all the time, and as I have said, one man simply cannot handle the amount of business that comes under the law.

Another thing in regard to the enforcement of the law is the education of the railways. I have found that we have very few station agents over the country who know anything about laws relative to nursery shipments, and in one or two cases they have been enlightened at the expense of the companies for whom they are working. In those localities they are now much more particular about receiving and delivering any stock that they may get in their office. To correct this matter I have in preparation a bulletin, which will be sent to the railroad offices, with a request that all station and express agents be issued orders governing this matter and instructing them not to receive packages unless they are properly tagged with the official state inspection tags. We have had several cases that have come up recently in the matter of shipping infested trees, and it has been rather interesting to me to see the way different nurserymen consider the matter. Some of them are a little bit "cranky" if their stock is held up because it is slightly infested with the San Jose scale, and others are cranky in other directions. I know of one shipment of stock that was returned to the grower because it was fumigated and showed signs of having been infested with San Jose scale. The man to whom that car of stock was consigned refused to receive it and sent it back to the grower. I rather admired the man who sent it back, but it was rather tough on the man who raised the trees.

Where there is a nursery that is badly infested and we do not believe that it could be properly cleaned up we do not hesitate to refuse to issue a certificate, and one of the largest nurserymen in the State of Indiana has been refused a certificate on that account now.

In regard to the matter of the study of the new pests that come up, the state entomologist, with the extensive inspection work that is outlined,

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has very great opportunity in the matter of gathering new pests, both in insect and fungus lines. During the past summer I have gathered material and made notes of at least two dozen new troubles that have come up in the nurseries of the state. These things are now being worked out properly in my own laboratory. These reports will come out in bulletin form.

There is another thing that is very interesting and one that has heretofore been given very little attention in the State of Indiana, and that is the subject of Crown Gall. It is most common on the apple trees, although it may be found on a number of others, such as the peach and plum. The Crown Gall is a swelling on the root or where the roots join the stem of the tree. It is a root trouble and not a stem trouble, and I will say, by the way, that we have some excellent specimens in the office, and I would like for all of those who could to come to the office, on the third floor, Room 121. The Crown Gall was formerly supposed to be the work of one of the Slime Moulds, and for a long time there has been a dispute as to whether it is plant or animal.

The most recent investigation of Crown Gall, however, shows that the disease is not of the Slime Moulds, but is a bacterial disease. The Crown Gall bacteria, as it is called, has been studied by Prof. Smith, and has been described by him in his very recent work.

In the matter of the apple cancers I have had considerable experience. Some nurseries were very badly infested. It is sometimes called the "apple stem fungus" and is caused by one of the several different fungii.

The fifth branch of the work, the matter of issuing and preparing bulletins, is an important one, because this has to do with the educational side, and for the present, at least, a great deal of the work must be on an educational basis. We have issued a small bulletin and one or two circulars, and most of you are probably familiar with them. If you are not I would like for you to get them from the office upstairs. We have now in preparation another bulletin on the fumigation of nursery stock and it will be out some time later in the year.

The work of this office is really just starting. What we have done is really a foundation of the work that will eventually be done. I have had enough experience in the State of Indiana to realize that there is a tremendous field for this work, and for good work. and what I have done and probably will do in the next few years will be to merely lay a foundation for future work of the same sort. I want to tell you that the foundation of this work is going to be laid right and I want the co-operation of all of you in laying this foundation. I thank you. (Applause.)

Mr. Ratcliff—I would like to ask if in these nurseries that were infested their condition would show that they had just been infested this year or longer?

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Mr. Douglass—Well, a great many of the infestations that I found this summer are of long standing; by that I mean that the scale had been on the premises for a number of years. The conditions would indicate that at least.

Mr. Traub—I would like to ask Prof. Douglass if he has examined the trunk of that tree over there to know what the trouble is? (See Figs. 3 and 4.)

Mr. Douglass—I have not examined it at all, but I don't believe that it is Crown Gall. I see, after examining it, that there is some evidence of Crown Gall on this, and up to this time I had not noticed the condition of the roots. I have never seen Crown Gall go clear up the stem. Possibly Prof. Troop will answer your question. I would say that a microscopic examination would be necessary to determine that, and I would risk an opinion on it.

Vice-President Reed—I want to say a word about Mr. Douglass' work. From my experience and from the experience of other nurserymen, he has had a great deal more to do than he could get through with, and I would like to urge on this Society that they give the proper endorsement to any committee on an appropriation for the State Entomologist that may go before the legislature seeking aid along this line in the way of an appropriation, and that they help this committee all they can. I have had experience during the past winter with the legislative committee that had the bills for this office, and we told the commtitee at that time that it would be impossible for any one man to do the work in the State of Indiana. I think Mr. Douglass will tell you that we were right. There were a number of nurserymen in the state who did not get certificates until very late, and I think the only reason was that Mr. Douglass could not get around. Isn't that true?

Mr. Douglass—Yes, sir.

Vice-President Reed—I know that some of the nurserymen wanted to ship two or three weeks before they could on account of the delay of their certificates and that is a very serious handicap to any nurseryman.

Mr. Ratcliff—I would like to ask the Professor if he would still advise spraying after the tree is badly infested, so badly that the leaves are shriveled? Is it advisable to try to prolong the life of this tree by spraying, or would it be advisable to cut it down and burn it, root and branches?

Mr. Douglass—The chances are that it would be worth while to experiment with the tree and try to save it, especially if it is a particularly valuable tree. I would suggest that you spray with a lime-sulphur-salt

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wash and at the same time fertilize the tree with a heavy potash solution. Of course this would all depend on how far the scale had gone.

Prof. Woodbury—There is one question that occurred to me that I would like to ask Mr. Douglass and that is, if he would withhold a certificate from a nurseryman whose nursery was infested with some other scale besides the San Jose? This may be of interest to others.

Mr. Douglass—I certainly would. It has been proven that the San Jose scale is not the only one that is doing damage in the State of Indiana. There are a number of scales in Indiana today that are dangerous, but they are overlooked, or have been in the past; but if I find a nursery infested with them to a dangerous amount I would certainly refuse a certificate.

Prof. Woodbury—I think it would be of advantage to have a book published on the various scales and insects and fungous diseases that would be considered sufficient to cause you to withhold a certificate from the nurserymen.

Prof. Douglass—We have published a list in our recent bulletin.

Joe A. Burton—You all know that I am not scientific, but practical, and I am a practical apple grower; and now in regard to the fumigation of a tree, I do not believe in it at all. I would rather get rid of the tree. It is easier to burn them than to fumigate them, and that is what it amounts to. It practically kills trees if you fumigate them, and the better way would be to burn them up and not send them out. I want to give out to all the nurserymen that I do not want any fumigated trees; I do not want any infested trees, either. There are other ways of killing the scale without fumigating. It may be that they can be fumigated and not killed; but with me fumigated trees are largely killed and those that are not killed are greatly damaged and the growth is not right. I am not in favor of this.

Now in regard to the question of Crown Gall. I can not diagnose a case of scarlet fever or ague, but I have a number of bulletins on Crown Gall, written by different professors and different experiment stations, and they say that Crown Gall is not only found on the roots of trees, but that it sometimes goes up. That is what I have been told, and some of my authority is from Virginia and some other places, and I took it for granted that this was a clear case of Crown Gall. I am going by what those bulletins say. I know sometimes I don't know when I think I do, and I don't believe Prof. Douglass had better say that is not Crown Gall.

Prof. Douglass—I simply said that I would not pass judgment, but

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that down at the roots it looked very much like Crown Gall. I never in my experience run across Crown Gall on the stem, and from what I know of the nature of the disease it is not a disease that is liable to extend above the moisture line of the tree. I have seen two hundred thousand nursery trees affected with Crown Gall and I have never seen one run up the tree in this way. I have most of the recent literature on the subject, too.

Mr. Snodgrass—I would like to ask this question. Do you know anything about the parasite of the San Jose scale, or whether this parasite is the parasite for the others? We have found a small, very small Lady Bug, only just large enough to be distinguished by the naked eye. I intended to preserve this one, but did not. It was dark in color and had red and black spots on it. Is that a parasite of the San Jose scale or other scales?

Mr. Douglass—It is true there are two parasite Lady Bugs feeding on the scale, but the trouble is there is not enough to do any good, and I think that you will find that they are only to be found in small numbers over this country, and in a great many places they are not numerous enough to be of any material advantage in destroying the scale. I understand that in northern China, where this scale is supposed to be a native, it is kept in control by a parasite Lady Bug and when there was an attempt to introduce this Lady Bug into the United States the attempt failed. Does this answer your question?

Mr. Snodgrass—Yes, sir.

Vice President Reed—Mr. Burton spoke in regard to nurserymen fumigating trees and said that he would just as soon have them burn the trees as to try to fumigate them. I do not think that they are injured in the least if they are properly fumigated. It would not hurt even the most tender nursery stock. In doing this care must be taken that just the proper amount is used. We have been fumigating for the last two years on very tender plants and have had good results. When fumigating you must be very careful that there is absolutely no moisture visible to the eye, and if you fumigate in that condition there will be no injury done.

President Swaim—Is these anything further?

Mr. Hobbs—I would like to ask if any one has had any experience in dipping trees?

Mr. Henby—I am a little like Brother Burton, in regard to fumigating, at least; my experience is that I have lost in fumigating trees. I am satisfied that unless great precaution is taken, as the gentleman says,

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the remedy is worse than the disease. Now, of course, there is a difference in fumigating and sterilizing, I suppose. I have seen a great deal of nursery stock that was sterilized, and virtually killed, and I would say that the work is too difficult, except for trained people from the experiment station. We will have to learn a great deal more about it, and our information is going to cost us something, for some one must stand the loss.

President Swaim—I think that if the work is properly done, as Mr. Reed suggested, there is little danger of injury. I think this is all the time we can give to this.

Mr. Hale—I called the attention of the Society at the summer meeting to another pest that is infecting my apples, the snowy cricket. Although nothing has been said in regard to this little pest I notice that there is scarcely a plate of apples in the exhibit made in the other room but has the marks of it upon the apples. I think this ought to be studied as well as some of the other pests. They have spoiled bushels of apples for me this year. I suppose they do not affect the orchards that are a distance away from the black raspberry vines. They were in my apples eating holes in them when I was gathering my Maiden Blush along in June, and they showed their work on the winter apples at the same time.

Prof. Troop—I would like for you to describe the full-grown insect.

Mr. Hale—It is a small, slim cricket, of a light green color. Their work is there on the apples, as little holes bored into the flesh.

Mr. Douglass—I would like to ask if the holes were eaten in or were punctured?

Mr. Hale—I saw some of these crickets working in a Maiden Blush tree and I watched them closely. They would eat and then turn around as if seeing if danger threatened them, and then eat again. I can show plenty of their marks on the apples, and I am surprised that you have not noticed them before.

Prof. Troop—I want to say that I am from Missouri and that I will have to be shown.

President Swaim—I think that we have taken all of the time that we should upon this topic. We have another topic yet this afternoon. We will now hear from Prof. Woodbury.

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PHOTO BY PROF. C. G. WOODBURY, PURDUE UNIVERSITY, LAFAYETTE.

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THOUGHTS CONCERNING THE FRUIT SPECIAL TRAIN.

BY PROF. C. G. WOODBURY, PURDUE EXPERIMENT STATION, LAFAYETTE, IND.

Prof. Woodbury—Mr. President, Ladies and Gentlemen: It gives me great pleasure to make a report to the society on the fruit and soil special.

This train was run over the lines of the Baltimore & Ohio Southwestern Ry. in Indiana on November 19, 20 and 21. The distance covered was about 220 miles. The train started from Vincennes and made twenty-four stops on the trip, including an evening meeting at New Albany, held under the auspices of the New Albany Commercial Club, and an afternoon meeting in the Grand Opera House at Aurora, on the last day of the trip. The estimated attendance, made by the special agent of the B. & O. management who accompanied the train, was 4,690. This makes an average attendance of practically two hundred people for every stop. When it is considered that during one entire day it rained steadily, an idea will be gained of the interest manifested along the line. The audiences, for the most part, were composed of farmers, the men whom we most wanted to reach, and many of them had driven miles to meet the train and to hear the lectures. Stops of about an hour were made at the various stations, and talks given by officials of the Horticultural Society and experts of the experiment station, upon the various problems connected with profitable fruit growing and upon the uses of commercial fertilizers and methods of soil improvement. These talks were illustrated by means of charts and enlarged photographs. The audiences were seated in the two coaches, so far as possible, as soon as the train stopped, and the lectures and demonstrations given in the cars, which were warm and afforded a comfortable place for those attending to listen. At several places, however, the crowds were so large that the train could not accommodate them. Preparations had been made for such emergencies, and at these places a separate set of charts were put up outside and an overflow meeting conducted in the open air. In the horticultural part of the work, special emphasis was placed upon the commercial and financial side of the business, and upon the adaptability of Southern Indiana to the profitable growing of various horticultural crops, especially apples. Circulars had been prepared by the experiment station emphasizing and taking up more fully the points that were brought out in the lectures, and these, together with reports and other publications of the Horticultural Society, were given to the audience as they left the train.

The horticultural part of the work was in charge of myself, and especial thanks are due to the officers and members of the Horticultural Society, who generously gave their time and thought, and also their voices in making it a success. Professor Troop, Mr. Swaim, Mr. Flick, Mr. Hobbs, Mr. Ritterskamp, and Mr. Joe A. Burton were with the train, either all or

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part of the time, and assisted in giving lectures and in answering the many questions that came up.

The running of the fruit and soil special was made possible by the active co-operation of the Horticultural Society, the Purdue Experiment Station, and the Baltimore & Ohio Southwestern Railroad. Right here I want to say a word in commendation of the railroad and its part. The train, consisting of engine, baggage car for the carrying of bulletins and reports, two coaches for the accommodation of the audiences, a sleeping and a dining car for the use of the speakers, and manned by engineer and fireman, conductor, brakeman, chef and porter, making a crew of seven men, having a dining and sleeping facility for the entire corps of lecturers, was run at a cost of from $150 to $200 a day to the railroad, but did not cost the people of Indiana a cent. The whole outfit was furnished free of cost by the road. The B. & O. Railroad, or any other road in Indiana, will not do this for the State Horticultural Society alone, from the fact that the late laws prohibit the giving of privileges by railroads to private corporations. Under the law the society is barred. They are willing to do it and are anxious to do it again for the experiment station, as a state adjunct or institution. I merely wish to state this, because it is a fact in accordance with the state law and emphasizes the good results to be accomplished by co-operation in these matters between the society and the experiment station.

Now as to the results accomplished. It is the purpose of this sort of work to arouse the interest of the people with whom we come in touch along the lines of railroads which we believe will be mutually profitable to us as a society and to them as individuals. It sets them thinking along new lines; it brings the existence of the Horticultural Society and the work of the society and experiment station before their minds in a way which they will not soon forget. As a result of the running of the fruit special there is a strip of territory from fifteen to twenty miles wide and two hundred and twenty-five miles long across southern Indiana in which every farmer has heard of the Indiana Horticultural Society and is interested in what the society is doing for the development of horticulture in the state. Later these men will be asking for more detailed information. They want us to come again and stay longer. In this kind of extension work we are sowing the seed; the harvest will show itself in a greater interest in horticulture. By awakening this interest we prepare the way for the holding of all-day meetings later on, where more detailed information can be given; we prepare the way for the discussion of these subjects in farmers' institutes, which there is a woeful lack of at the present time; we prepare the way for the formation of local horticultural societies, and finally for the growing of more and better fruit in Indiana, which is the end for which we all are working.

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There are several here who were on the train and I think a few remarks from them will be in order. I would suggest that Mr. Hobbs tell us what he thinks of the fruit special.

Mr. Hobbs—Mr. Chairman: I think that Prof. Woodbury has presented the matter as fully as I could, and I think enough in detail, and I do not know that I care to add anything more at this time. It is my opinion that the running of this special train was of great benefit to the section through which we passed. There is no question in my mind at all about that. The people showed a very deep interest in the work, and the only criticism they seem to make is that there was not enough of it.

President Swaim—Mr. Burton, you were on that train. Can't you give us a word?

Mr. Joe A. Burton—The trouble is, I have been speaking in institute work ever since I left the train and on that account I have a sore throat and came very near not getting to come here on account of it. I have not thought as to what I can say. The people seemed to be deeply interested. We made them hungry for apples. I think I could have given away ten barrels of apples easily. They usually dismissed the schools and came to the cars, and how hungry for apples these little people were! I asked them at one place how many of them had apples at home, and there was just one hand up, and I told them that I was sorry for them and told them to go home and beg their papas to grow some apples for them. People were very enthusiastic, and I believe that they were wakened up. We want to awaken them out of their lethargy and get them hungry for apples.

(Applause.)

Prof. Troop—I want to remark that this work is going to bear fruit at least, and these people that Mr. Burton spoke about are going to get their eyes open. I want to say that there have been quite a number of questions asked since the fruit special was run from men in different parts of the state, and before I left home I received a letter from Allen County and the man said that he was expecting to buy a fruit farm, and he had seen the reports of this fruit special in southern Indiana and he wanted all of the information he could get in regard to southern Indiana, and so you see it is going to bear results.

Prof. Woodbury—I will remark that it is not the intention of the society to let this matter rest here. We do not intend to so emphasize fruit growing in the southern part of the state that those from the northern part will move down there. We intend to try to interest northern Indiana as well as southern, and our next move will probably be through the northern part of the state.

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Mr. Snodgrass—I feel like I should say a word. It seems to me that the people in central Indiana would like to have an interest aroused in their section as well as those in the northern and southern parts.

Mrs. Cleveland—My father, Joe A. Burton, sent me some apples not long ago and my neighbors pronounced them very good. I, too, think the central part of the state grows just as good apples, and is in need of some of this enthusiasm to arouse them to grow more.

Mr. Devore—At some proper time I would like for the professor to tell us what bitter rot is, and the treatment for it. I happen to know an orchard where this continues from year to year.

President Swain—Prof. Woodbury, will you outline the treatment?

Prof. Woodbury—It is a fungous disease and is caused by a spore. This finds lodgment on the apple and causes the bitter rot. It has been demonstrated by the experiment station and by the United States Department of Agriculture that the bitter rot can be controlled by Bordeaux mixture. It possibly will have to be administered four or five, or even six times, at times, and the number of times depends upon weather conditions and the particular season in which you are working. I would make the first application before the blossoms open and would follow that with four or five applications during the season.

Mr. Devore—Where do the spores come from?

Prof. Woodbury—They usually winter over on the dead leaves for the most part. If you can get rid of the winter spores you can overcome the summer ones. These spores will live a long while without germination, but when the proper time and condition comes about they will germinate, and that quickly.

Mr. Devore—It is external to the tree?

Prof. Woodbury—Yes, sir.

Mr. Cory—I would like to invite you people to run the special train into northern Indiana. We have people coming from the west telling us of the marvelous opportunities in their region and they are taking some of our young men there with them, and some of them succeed, but most of them come back to us broken down for the balance of their days. We believe that a man can prosper in our country as well as in any other, if he will put the energy and intelligence into it that he has to out in other places to succeed, and we would like for the station and the society to get up some enthusiasm along this line in our section.

Mr. Hobbs—That is a very good point.

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Prof. Troop—I will say that we were intending to run a train through both the northern and the southern part of the state last fall, but we were delayed so late that we finally gave up the northern trip, thinking that the south needed it the worst. It is our intention, next spring, perhaps, to negotiate with some road in the northern part of the state and do something up there.

Mr. Snodgrass—We hear so much about running this special through northern and southern Indiana, and why do you ignore the central part of the state? We need some education just as well as the others; we are not the only smart people there are, and I believe we ought to have some demonstration work in central Indiana. We hear people talking very enthusiastically about going to Canada to raise fruit. Now, we have about the same character of soil as they have in Canada, and some of the northwestern states in central Indiana, and a better climate, and if they can raise good apples there in their cold, bleak climates, we ought to be able to grow fruits in central Indiana. I believe that our people ought to be made to know that. I think some of the finest fruit grown in the state is grown in the central part, and I think you ought to help us get up a little enthusiasm in this region.

President Swaim—I will say, in reply, that if Mr. Snodgrass will stir up his cranium he will remember that we did have a series of demonstrations in his territory and it did much good; the people were intensely interested and big crowds went to the orchards to see the practical demonstrations. I think the people learned more from seeing the actual demonstration of this work than they would have learned in weeks or months of listening or reading, and I am satisfied that it would do a great deal of good if we would do more of such work right here in central Indiana.

Mr. Snodgrass—The demonstration work you speak of was in east central Indiana.

President Swaim—We were at Greencastle, Hadley, Irvington, Greenfield, Knightstown and Richmond, but there is still lots of territory unworked.

Mr. Snodgrass—We should spend the state appropriation next time.

Prof. Woodbury—I will say that we are anxious to get in our work, and if your horticultural society will give us an invitation we will come over and give you an all-day meeting.

Mr. Snodgrass—We would have to organize the local horticultural society first.

Mr. Milhous—I would like to ask if it is true that if a society asks Purdue for a day's field work, they will come?

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Prof. Woodbury—If we received notification two or three weeks beforehand, I think that I could safely say there is no time but what we could accommodate you.

Prof. Troop—I am glad to hear those remarks made. It shows that there is an interest all over the state in this matter, and that is what I am very glad to hear.

President Swaim—Has anyone anything further to offer? If not we will proceed to close for the afternoon. I wish to urge that the district committeemen who are here present hand in their reports to the secretary as soon as possible, for it is very important that we have these reports. We will not attempt to have these read, for they consume too much time, but we want them filed with our secretary, so that they may be published with the report.

I would like to say that I have a message here from R. A. Simpson, expressing his regret at being unable to be with us on account of serious sickness. We assure him that we all regret as much as he that he cannot be with us. He wishes for us a profitable meeting.

I have a few committees to appoint and will appoint them at this time:

Committee on Resolutions—C. G. Woodbury, Mrs. A. H. Bogue, E. R. Gustin.

Committee on Awards—Jacob Listenfelt, J. K. Henby, J. C. Grossman.

Auditing Committee—L. B. Custer, J. M. Snodgrass, R. A. Troth.

Committee on Nomenclature—C. M. Hobbs, E. Y. Teas, James Troop.

Committee on Product of Experimental Orchard—W. H. Ragan, W. C. Reed.

If there is nothing further to come before this meeting at this time we will consider ourselves adjourned until this evening at 7:30.

The meeting stood adjourned until 7:30.

SECOND SESSION, 7:30 P. M.

President Swaim—The meeting will now please come to order. Brother Apple will lead us in prayer.

Mr. Apple—Our Father and our God: As the anxieties of the day and the cares thereof are past, and we are permitted to meet together again, we come with grateful hearts to Thee for the things which Thou hast bestowed upon us now and in the days past and gone. We thank Thee for Thy guiding care and protection over us and about us during the days, weeks and years past and gone. We ask Thee to guide us in the deliberations of this evening; may we be guided by Thy wisdom in such a way and

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manner that whatever is said or done tonight may be in accord with Thy divine wisdom. Bless this work and this society, and may we go on in this work until this state shall provide an abundance of fruits for our use, and beautiful flowers for the uplifting of our souls' desires, and be known as an horticultural state, bright and shining among her sisterhood. Bless all for whom it is our duty to pray, and guide us all through life. We ask it all in Jesus' name. Amen.

President Swaim—The first topic on the programme this evening will be:

THE MINERAL RESOURCES OF INDIANA,

BY W. S. BLATCHLEY, STATE GEOLOGIST, INDIANAPOLIS, INDIANA.

(Applause.)

W. S. Blatchley—Mr. President, Ladies and Gentlemen: You may ask what the natural resources of Indiana have to do with horticulture—fruit growing. I think that when the connection is studied we will find that there is an important relation and that it adds very much indeed to the opportunities that our state offers to fruit growing and farming. To develop these vast beds of mineral wealth will employ thousands of working people, who will form little towns and villages in our state, affording a nearby market for a very large share of our farm products and fruits. We all know that the greatest profit to the farmer is when he is within reach of, and sells his surplus, directly to the consumer, and is not obliged to make use of the middlemen. These little towns, communities and working people will afford the farmer an opportunity to trade directly with the consumer. So you see that one of the advantages to you in the development of the state's mineral resources is the means of bringing a market for your products to your door. The mineral resources of our state will bring a large number of workingmen and their families into our state for permanent residence who are to be fed and clothed, and we should be prepared to supply their needs.

The natural resources of the State of Indiana, as of any other restricted area of the earth's surface, may be classified into two great groups. The first of these consists of those forms of matter which have stored within themselves potential energy in the form of heat. When this is set free by combustion and then controlled by some device of man, it is used by him to perform the work of the world. Such natural resources are called fuels, the most important of which, as found in Indiana, being coal, petroleum and natural gas.

The second group of natural resources consists of those forms of matter which are devoid of any kind of stored energy which may be set free by

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combustion, but which are themselves used by man for varied and important purposes. They comprise the raw materials, which he fashions into varied forms for the use of the world. The most valuable members of this group found in the state are limestones, sandstones, clays and marls. Other and less important members are sands, iron ores, mineral paints, etc.

FUELS OF THE STATE.

At the present time the relative importance of any state or nation in the world is very largely determined by the amount of available fuel which that state or nation possesses. The fuels of Indiana, viz., coal, petroleum and natural gas, are valuable only for the stored energy which they contain. How came that energy within that matter? When was it there confined? Let us try to answer briefly these two questions.

Matter and energy are the two things which comprise the universe. Matter is anything which occupies space, as stone, water, gas. Energy is that which produced, changes or destroys motion in matter. In other words, it is the power of doing work. Energy exists in a number of different forms, as heat, light, electricity, gravitation, etc.

About the year 1800, man began to study more closely than ever before both matter and energy, and as a result he made, during the nineteenth century, many important discoveries concerning them. The two greatest of these discoveries, which, more than anything else will make that century famous throughout all time—are embraced in those grand natural laws known as the "Law of the Indestructibility of Matter," and its correlative, "The Law of the Conservation and Correlation of Energy."

The first of these laws merely asserts that "Matter cannot be created, cannot be destroyed;" that the same amount, the same number of tons, pounds, ounces, yea, even grains, exists in the universe today as existed at the beginning of time. If you can understand this great law and all that it embodies; if you can bring yourselves to feel and know that every particle of soil, clay, stone or coal on, or in the earth has been formed from matter already in existence; that every living plant or animal is made up of matter which has existed for thousands, aye, millions of years, and much of which has been used over and over again in the structure of previously existing animals and plants, you will have gotten the main idea of this law, and will be the better able to understand many of the statements which I shall make tonight.

The law of the conservation and correlation of energy asserts: "That energy, like matter, cannot be created, cannot be destroyed, but that one form can be changed into any other form." In speaking of the natural fuels of the state, it is this law which we must ever bear in mind, as stored in these fuels is found the heat or energy which will drive the engines and

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turn the wheels for future generations. Man can invent no new forms of energy, nor can he produce a single iota of energy. He can only devise machines for setting free, and transmuting or changing forms already existing into other and more available forms.

Another great truth which has become fully understood only in recent years, but which is very important in this connection, is that the sun is the source of all the energy used in performing the work of the world. From the sun comes heat and light which fall upon the grass and grain and trees of the earth and furnish the power or force necessary for their growth. The plants use the heat and light to assimilate their food and promote their powers of vegetation, and at the same time they store up these forms of energy within their cells.

Suppose, for example, that 1,000 calories (heat units) of heat are used in producing an ear of corn. When the ear is mature, that amount of heat, no more, no less, is stored up within its cells. This heat can be made available to perform work for man in two ways; (a) By burning the corn in a furnace, when the heat will be freed and can be used to generate steam which in turn will cause wheels to revolve. (b) By feeding the ear of corn to a horse, in whose body the heat will be changed into muscular energy, which can be exerted in turning wheels or in pulling loads. Or man himself can eat the corn, and the heat which is stored up in it will in his body be changed into muscular and mental energy. Thus the muscular force with which these words are written and the mental energy necessary to evolve the thoughts which they comprise, can be traced back to the sun's heat, which somewhere, in days gone by, fell upon and was stored up by plants, which directly or indirectly have formed the recent food of the writer. In other words we move muscles and think thoughts with the energy derived from the sun's heat and light.

The falling waters pulled by the force of gravitation down to the level of the sea, and on their way doing work for man by turning the wheels of many forms of machinery, were raised from the ocean by the heat of the sun; while the winds which bore those waters in the form of clouds to the higher levels of the land also owe their power of movement to the unequal heating of the atmosphere by the sun's rays. Every ounce of steam and every current of electricity utilized by man is therefore derived from or produced by the sun't heat.

Plants alone have the power of thus storing up the energy of the sun's light and heat. Animals are wholly lacking in this power, and can only utilize the energy so stored by plants. The vegetable cell is thus a storer of power, a reservoir of force. It mediates between the sun, the sole fountain of energy, and the animal life on the globe. The animal cannot use an iota of power that some time, either directly or indirectly has not been

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stored in the plant cell. This storage is forever going on. Of the vast floods of energy that stream forth from the sun's disk in the form of heat and light, an insignificant fraction is caught up by the earth as it revolves in its orbit. Of the little fraction that the earth thus arrests an equally insignificant part is used directly in plant growth. Yet the entire productive force of the living world turns on this insignificant fraction of an insignificant fraction.

Bearing in mind this great truth, we can better understand how in ages past the sun's light and heat were locked up in the cells of those plants which flourished in the swamps of the old Carboniferous age. For thousands of years it accumulated within their stems and leaves and spores, and when, by the processes of nature, the plants were changed into coal, it still remained, a most valuable heritage for future man.

In the same way the heat stored up in the petroleum and natural gas of the Trenton rocks came from the sun and was stored in the cells of those countless smaller forms of plants which grew on the margins or in the waters of the ancient Silurian seas. Animals used these plants for food, and so received the heat, and when they died, by a process of slow destructive distillation, the carbonaceous matter within their bodies was changed with its imprisoned heat into the gas and oil now so valuable as fuels.

We have thus seen that a fuel is but a form of matter containing within itself a stored supply of potential energy in the form of heat. This stored energy is the richest inheritance which has come down to man from the ages past. Millions of years have been necessary for its accumulation. At the present rate of consumption a few thousand will suffice for its total dissemination. We are drawing upon it with a lavish hand. It came to us without great labor, as comes oftentimes the accumulated riches of a toiling and thrifty parent to a spendthrift son and, as with the latter, "come easy, go easy," seems to be our motto.

The most important thing to remember in treating of these natural fuels is that no coal, no oil, no natural gas is being formed beneath the surface of our state today. Our present supply of each of these fuels will never increase, but ever diminish. Each constitutes a great reservoir or deposit of reserve energy upon which the people of the present generation are daily drawing without adding thereto. Like a bank account under the same conditions, it is only a question of time until it will become exhausted.

COAL.

Seven thousand square miles, or one-fifth of the area.

Eastern Interior Coal Field—46,000 square miles in central and southern Illinois, northwestern Kentucky and southwestern Indiana.

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BLOCK COAL.

It can be mined in blocks as large as as it is convenient to handle. These blocks split readily in the direction of the bedding plane, but in the opposite direction are broken with difficulty.

It is as pure as splint coal, is almost free from sulphur or phosphorus, and has the softness and combustibility of wood. In burning it swells so little that its expansion is scarcely perceptible, does not change form, and never cakes or runs together; hence, it is a most valuable fuel for the blast furnace and the cupola of the iron founder.

For steam and household purposes it has an unrivaled reputation. It burns under boilers with a uniform blaze that spreads evenly over the exposed surface, thus securing a more uniform expansion of the boiler plates. Its lack of sulphur also causes it to have but little detrimental effect upon the boiler, grates or fire boxes. In household grates it burns with a bright and cheerful blaze, like hickory wood, making a very hot fire which, for comfort and economy, cannot be surpassed by any fuel except an abundant supply of natural gas.

One million five hundred and twelve thousand and ninety-eight tons in 1900.

Seven hundred and forty-six thousand six hundred and seventy tons in 1906.

BITUMINOUS COAL.

Forty billion tons workable coal.

Knox	7 billions
Gibson	6.7 billions
Sullivan	4.6 billions
Vigo	3.4 billions
Daviess	2.4 billions
Vanderburgh	2.2 billions

Up to 1899, one hundred million tons mined. Between January 1, 1899, and January 1, 1907—eight years—70,213,404 tons mined.

11,422,027 TONS IN 1906.

It was estimated by Dr. Ashley that if the past rate of increase of production be maintained, the coal supply of Indiana would last not less than three hundred years. Owing to the rapid failure of natural gas the rate of increase of production was greatly enlarged, fully seven-tenths as much being mined in the last eight years as in the previous fifty years. During the past four years the output has been more steady, averaging a little above ten million tons per annum, and from now on a smaller and more regular rate of increase will doubtless be maintained. In the words

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of Dr. Ashley: "Constantly improving methods will tend to lengthen the life of the field by securing a larger proportion of the coal in a given area and by rendering workable much coal now considered unworkable. On the other hand, changes and exhaustion of competing fields and the invention of better methods of utilizing the Indiana coal, by increasing the demand, will tend to shorten the life of the field. On the whole, it seems safe to assume that the life of the Indiana coal field is at least 300 years, and probably more."

Finally, it may be said that the human mind cannot conceive the vast amount of energy at present locked up in the coal fields of the state, nor place anything like an accurate value upon it. The richest men of the nation today are those who have utilized the stored energy found in coal in years gone by; who have bought this energy at low prices, and either sold it in the form of manufactured articles at many-fold its cost price, or used it in transporting, for hire, man and his products to the four quarters of the globe.

PETROLEUM.

First well at Keystone, Wells County, in 1890. One thousand two hundred and eighty square miles.

Sixteen years—1891 to 1906, 85,109,048 barrels, valued at $70,999,592, or an average of $4,436,474.

1906—7,762,825 barrels, or 3,129,613 less than in 1905.

Value of 1906, $6,877,863, or average of 88.6 cents per barrel.

Princeton.

Huron standstone.

1906—103,843 barrels, valued at $81,771.

Terre Haute.

Corniferous.

Seven thousand two hundred and sixty-nine, valued at $8,456.

Unless the area of production be much increased, the output of petroleum from the Indiana fields will from now on gradually dwindle, as several thousand new bores are necessary each year in order to offset the decrease in output of those already producing. These are possible only when the market price is such as to stimulate the producer and guarantee him a fair profit on his capital invested. Whether or not any new productive area of consequence will be added to that already known only the future use of the drill will show, since the great depth at which the oil bearing strata lie makes it impossible to gauge from the surface their area and content.

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NATURAL GAS.

Natural Gas.—One of the most valuable and convenient fuels known to man is natural gas, the volatile part of crude petroleum. During the ages which have elapsed since the petroleum was formed in the depths of the Trenton and other rocks of Indiana, large portions of it volatilized or changed into gas. Wherever possible, this gradually rose and passed into the higher porous portions of the limestone, where it was held by either petroleum or salt water behind it. From its discovery in Indiana in 1886 the field was gradually developed until it reached an area of approximately 2,500 square miles, embracing part or all of seventeen counties near the center of the eastern half of the state. The original rock pressure was 350 pounds and some of the wells yielded 12 to 14 million cubic feet per day.

In the early history of the field there was an enormous waste, some of the wells being turned on full blast and allowed to burn as an advertisement. It was estimated that in the last six months of the year 1887, fifteen billion cubic feet of gas, worth, at an extremely low estimate, $1,500,000, was wasted in this manner in the Indiana field.

So greedy was the citizen of the gas belt in those days, so ignorant of the real value of this gaseous fuel and the manner of its formation, so reckless in its consumption, that at the end of a score of years there remains only the dregs of the plenty that has been.

Used only for household use in a small portion of the old field.

RESOURCES OTHER THAN FUELS.

Indiana Oolitic Limestone.

Finest building limestone on the Continent of America.

Area narrow—two to fourteen miles in width—extending from Greencastle to the Ohio river.

Twenty-five to 100 feet in thickness.

Any size blocks.

Readily sawed into any form desired.

Two million seven hundred thousand dollars in 1906.

Niagara Limestone.

Laurel, Franklin County; St. Paul, Westport and New Point, Decatur County.

This stone can be quarried more easily and at less expense than any other stone of a similar nature in the state; the natural seams and even bedding doing away largely with the necessity for drilling and blasting in many places. The stone occurs in natural slabs of a uniform thickness—

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two to twenty inches—and with the upper and lower surfaces very even, so that for many purposes tool dressing after quarrying is not necessary. It is of a handsome color, very hard and durable, and is used extensively for bridge abutments, flagging and curbing, and to a less extent for window sills, window caps, range stones, ashlar, doorsteps, foundations, street crossings, gutter stone, pier footings, etc. For many of these uses it is better suited and can be furnished more cheaply than either the Indiana oolitic limestone or the Berea (Ohio) standstone, the two materials with which it comes in closest competition. Across Fall Creek at Indianapolis, some of the most handsome and durable bridges in the state have recently been constructed almost wholly of this stone.

Mitchell Limestone.

Very pure $CaCO_3$. 99.04 per cent.

The Mitchell limestone is quarried in large quantities and used for road metal, wagon roads or railways, for flagstones, for paving and curbing, for burning to quicklime and for building stone. It is one of the best road metal stones in the State of Indiana, comparing favorably with the Niagara limestone of Silurian age in this respect, but it is harder and generally superior, since the Niagara in many places has thin layers of intercalary shale which, if not separated in the quarrying, will quickly form mud on the roads.

This limestone has been used quite extensively, especially during the last few years, in macadamizing the roads in the area where it occurs. Many small quarries have been opened from which the stone has been obtained for local use. A number of large railway quarries, where the stone is taken out extensively for railway ballast or road material, are also scattered throughout its area. Each of these quarries is capable of turning out from ten to thirty carloads of crushed limestone per day.

The use of crushed stone for macadam and concrete work is constantly growing, and the business of preparing the stone for such uses will, in the near future, become a more important industry in many localities of the state than at present, as there are many places where the limestones outcrop in quantity close to a railway and offer excellent sites for the investment of capital. In 1905 the value of crushed stone manufactured in Indiana was $336,812, divided as follows: For road making, $222,441; for railroad ballast, $84,007; for concrete, $30,364.

CLAYS AND SHALES.

The clays of Indiana rank in value next to coal and petroleum among the natural resources of the state. A dozen years ago the term "shale" was almost unknown among such resources. Those great beds of soft, blue-

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gray, thin-layered rock which occur over vast areas in the coal bearing counties were then looked upon as a wholly valueless nuisance, which had to be removed or tunneled through before the underlying veins of coal could be reached. Today the smoke is pouring forth from hundreds of kilns where these shales are being burned into sewer pipe, hollow block, conduits, paving brick, pressed front and ordinary brick, drain tile, etc. It is only within the past ten years that capitalists have come to realize to some extent the vast possibilities which the clays and shales of western Indiana present for manufacturing purposes. Even yet but few of the main deposits are being worked, and there is room for five times as many factories as are now in operation. During the past five years all factories have had many more orders than they could fill and, on account of the rapid advance in the price of lumber, the future of the clay industry is a most promising one.

Not only have the Carboniferous shales been proven in the highest degree suitable for the best of vitrified wares, but the Knobstone shales, which were accounted even more valueless than those of the Carboniferous age, are in several places now being utilized for vitrified, pressed front and ordinary brick, and in three of the largest factories of the state as the clay ingredient of Portland cement. The factories now utilizing them are but the pioneers or forerunners of many yet to be; for these hitherto ignored Knob shales possess almost unlimited possibilities of service for practical use.

Kaolin of Lawrence and Martin Counties.—The purest clay in Indiana is the kaolin of Lawrence and Martin counties. The best grades of it are pure white, and show a chemical analysis of 98.61 per cent. silicate of alumina, and but 1.47 per cent. of fluxes. The poorest grades are yellowish brown in color, but even they contain no more than three per cent. of iron oxide and but 5 or 6 per cent. of all impurities combined.

The great drawback to this kaolin is its lack of plasticity. Otherwise it would be in every way suitable for the best grades of porcelain ware. It is, however, suitable in the highest degree for the manufacture of alum salts for the sizing of the finer grades of wall and letter paper. Its refractory properties are also very great, and for that reason, if mixed with a small percentage of the underclays of the nearby Coal Measures to render it more plastic, it can be used for making the finer grades of refractory wares, such as retorts, glass pots, glass tanks, etc. Ground fine with a bond clay and pressed dry, it will make the highest grade of fire brick. The best flint clays of Ohio and Kentucky, from which the high grade refractory products of those states are made, are, like the Lawrence County kaolin, wholly non-plastic, and have to be mixed with a plastic under-clay before they can be burned into fire brick and similar products. Recent ex-

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periments have proven this kaolin also suitable for making a filler for furniture and buggies; for cosmetics and for ultramarine.

At the largest known deposit, four miles north of Huron, Lawrence County, thousands of tons of this purest of clays can be seen, comprising a stratum five to 11 feet in thickness; yet, since 1891, not a pound has been put to use. The deposit is not a local one, covering a few rods or acres, but square miles, as evinced by outcrops which are known. There is enough in sight in the mines at this one deposit to last an average factory a hundred years, and not one one-thousandth of it has been exposed to view. There it lies, a great mineral resource of untold value, unworked, unutilized, awaiting only the coming of energy and capital to make it up into many kinds of products which are now brought into our state from distant lands.

Fire Clays of Vermillion County.

Shales of the Coal Measures.—On January 1, 1907, there were in Indiana six large factories using carboniferous shales for making paving brick, while 13 others, among which are the largest clay-working industries in the state, were making hollow wares from either the shales or the underclays of the coal measures. These do not include numerous factories making stoneware, drain tile, building brick and many other products from the shales which a dozen years ago were practically unused and despised.

Shales of Knobstone.—Value of clay products of Indiana in 1906 was $6,980,247, as against $3,858,350 in 1900.

CEMENT RESOURCES.

No mineral industry in the United States has grown more rapidly during the last fifteen years than that of the manufacture of Portland cement. In 1890 there were but sixteen plants making such cement in the United States. Their output was but 335,600 barrels, while 1,940,186 barrels were imported. In 1906 the number of plants in the United States had increased to 89, while their output reached the enormous total of 35,246,872 barrels for the year.

Portland Cement.

1900, not a barrel made in Indiana.

1906, 3,867,427 barrels, valued at $4,947,180 at the plants.

Making of Portland Cement.

The lime carbonate.

Marl and area.

Mitchell and Bedford limestones and area.

The clay ingredient, 23 per cent.

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The building of the Panama Canal, which will require more than 12,000,000 barrels of cement; the rebuilding of the cities of Baltimore and San Francisco, especially along their water fronts; the enormous increase in the consumption of cement caused by its use in the various forms of concrete construction, and the increasing demand throughout this country for cement sidewalks, point toward a bright outlook for the Portland cement industry in the future.

Hydraulic Cement.

For a number of years, between 1895 and 1900, the Indiana plants made two to three million barrels of natural rock cement yearly, but on account of the great activity in the Portland cement industry, that of the hydraulic cement has dwindled until in 1905 but 527,600 barrels, valued at $211,040, were produced. The deposits of limestone are as abundant, and the transportation facilities better than ever, yet it is very doubtful if the industry soon again reaches the proportions it held a decade and more ago.

MINERAL WATERS.

Water from eighty springs and eighty-six wells.

These wells and springs are distributed among fifty-two of the ninety-two counties of the state. At a number of them large hotels and bath houses have been erected for the accommodation of guests. Those of two or three localities have already become so noted as to attract many thousands of visitors each year from all parts of the United States. A number of other springs and wells of the state have waters which are as valuable and worthy of increased public patronage as those of these better known resorts.

It is the writer's opinion, based on personal experience, that the change of surroundings and diet, the increased amount of recreation and exercise, obtained by a few weeks spent at the sanitariums and resorts, have quite as much to do with bringing about a cure of many patients as does the water itself. There are many ordinary springs of pure water, i. e., water containing only a few grains of lime or iron salts per gallon, located near villages in this state, which are claimed by the inhabitants to possess remarkable curative properties. Old persons who seldom get ten rods from their homes, and business men who are kept indoors most of their time, begin to visit such springs, and once or twice a week walk or drive quite a distance to bring home a jug full of the water. The increased amount of exercise thus obtained, as well as the change of scenery, however limited, and perhaps the drinking of an extra amount of water each day, are the causes of the improved health rather than any curative properties possessed by the water.

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IRON ORES.

Ranging from 28 to 54 per cent. iron.
Fifty carloads at $2.00 per ton.
Slag as a by-product.

GOLD AND DIAMONDS.

Other Minerals and Ores.—With the exception of the placer gold mentioned, no gold, silver or other precious metal occurs in the state. Much money has been foolishly spent and time wasted by people who have thought otherwise; but they have ever had their labor for their pains.

In many of the northern counties small pieces of "black jack" or zinc blende, galena or lead sulphide, and native copper ore, are occasionally found, and give rise to much local excitement and speculation. It is needless to say that the specimens of copper and lead were also brought in by the drift or by the Indians; and the blende, while possibly of native origin, is, on account of its small quantity, utterly valueless. In almost every county one also hears tales of reputed silver and lead mines, which in the days of long ago were secretly worked by the Indians. Many well informed people yet believe these tales, and have spent days in fruitlessly searching after imaginary mines, where enough silver may be had to pave the streets of their native towns, or where lead ore exists without limit.

While Indiana is thus lacking in the precious and other useful metals, her deposits of coal, clay, stone, petroleum and cement resources are far more valuable, and are bringing more wealth into the state than if, instead of them, rich mines of gold and silver had been found within her bounds. Higher grades of labor, and more stable industries are based upon such resources, for few, if any, large factories utilize gold and silver in quantity as a manufacturing resource.

Applause.

President Swaim—As the programme is rather long for this evening, I fear that we will have to go on without the discussion of this question. Our next topic is:

HOW ELEMENTARY AGRICULTURE MAY BE TAUGHT IN THE PUBLIC SCHOOLS.

BY PROF. FISHER, OF PURDUE UNIVERSITY, LAFAYETTE, INDIANA.

Prof. Fisher—Ladies and Gentlemen and Members of the Indiana Horticultural Society: I should like to know how many persons in this room have been school teachers? Well, I see that quite a number of you have been. I presume that most of you have gone out of business and are looking for gold and silver in raising fruits, etc.

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I want to talk to you a few minutes, if I may, about the real gold and diamonds of the state—the boys and girls of our country district. We may say, and it may be said by very many, and it is said by a very large number, that there is no necessity for teaching agriculture in the district schools or the public schools, for the parents of the boys and girls can teach them that at home, and that there is no necessity for wasting the time that ought to be given to such fundamental things as reading, writing and arithmetic, and other such subjects. We are also told as to how the mother should teach her girls to cook and sew and take care of the household. I want to submit this proposition to you. There is as much necessity for teaching agriculture in the district schools, and domestic science to our boys and girls of the country districts and of the small towns and villages and cities as there is of teaching hygiene and scientific temperance to them. You may not believe that, but I do. I presume that there is not a man or woman here who does not think he or she is capable of teaching the children that it is necessary to be cleanly in his habits, and that he should eat proper food and take care of his general health and that tobacco and alcohol are poisonous to the system, and are injurious to it. Every one of us think that we can give our children some advice along this line, but you do not do it. Just so with the father and his good wife—they do not do it. The instructions which are given by the parents with regard to hygiene and scientific temperance are largely in the line of reproof. The instructions which the boys and girls get on the farm with regard to their line of work is very largely in the way of mechanical knowledge, for there is very little explanation of the whys and wherefores. We may say that the teachers are not ready to teach agriculture. They are not, but why wait upon the preparation. There is always a demand and a beginning before there is a preparation. When agricultural colleges were established the men were not ready to equip them. The older men here know about these colleges and can recall the men that were associated with them in those early days, and they could tell you that some of these men were very, very little prepared for their work and were not suited to it. But when the agricultural colleges were established they picked up the best men they could find and put them to work, and when they found better men they put them in their places, and so on. Today, even, our stations are calling for better men, and yet we have been training men for over a quarter of a century on agricultural subjects. We are trying to make specialists along different lines, and yet the colleges are calling for better men. So it is with the teachers of agriculture in the public schools. We will have to start with what we have, and when we find better teachers we will put them in their places. The teachers of today are not as good as they should be, but they are manifestly much better than they were twenty-five years ago, and

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yet they lack information and ability, and we are still trying to train teachers for these schools and are and have been giving great attention to the training of teachers for the public schools for years. We do not wait upon the preparation of teachers, and did not when the public schools began, but they began with what they had. And so we will have to begin with the teachers in the public schools. I would say that two requirements are necessary or essential for the successful teacher of agriculture, or rather the successful teaching, and the first is the teacher, and the second is the consolidated school. The teacher needs to have three requisites, first, interest and sympathy with the subjects to be taught. This is true of any subject that is to be taught. If a teacher teaches arithmetic he must have some interest and sympathy for it and he must try and master the subject. A teacher can not teach history successfully unless he is interested in history and is well grounded in it. A teacher must have interest and sympathy. You know how little we observe or notice things as we go through life. Most of you people are interested in horticulture, doubtless, and doubtless the most of you know that the birds are your best friends. What do you know about birds? Do you know how many birds are remaining over for the winter? I wonder if you could name them. Do you know the names of the various trees that we have in our forests? Do you know the birds that are beneficial to you and the ones that are harmful? Have you observed these things? Have you observed the work of the sapsucker? Do you know him from the woodpecker? Have you observed that these birds are working in your orchards? Both of them are not there now; one of them does you good and the other does you harm. Do you know the wild flowers in your meadow? Do you know the weeds and their habits of growth? Do you know the trees in the forest? You have lived in the woods all your life and do you know the trees when you see them? If I should pick up a dozen different leaves of the woods and bring them in here could you identify them? You ought to be able to, since you have lived with these things all of your life. I think I would catch most of you before you got through the whole dozen. I doubt if most of you could pass seventy-five per cent. on an examination. You have not been trained to observe these things. Now the teacher who is going to teach agriculture or any of the other natural sciences must be an observer. That is one of the requisites. Thirdly, you must have information on the subject. As I have just said, most of you are not well prepared along that line. So it is along all other lines of work; the teachers do not have full and complete information. I dare say that I could not find a teacher, a live teacher, who would admit that he or she knew all he or she feels they ought to know about any subject they are teaching. They realize that there is more and more to be known, and I think all of us realize, as we look

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into our own particular line, that there is more and more to be known about our subject. Now, here you are. Some of you have been raising fruit year after year, and you are attending this meeting, not to tell what you know, but to find out what some one else knows. You want to learn what you ought to have known years ago. You have been working with apples and other fruits, some of you, for forty or fifty years, yet you think there is still more to be learned. So there is, in your line of work.

The teacher who is in sympathy with his subject will be an observer. The more information we get the more we require, and the more facts we assemble together. All sciences have been establishd in this way. Our chemistry, physics and botany tell us there is no science of agriculture. I want to call attention to that fact. We think we know a great many things and facts demonstrated in agriculture, and we should begin to systematize these things and facts so that we will be able to show that there is a science in agriculture. But we are not discussing that point.

We come to this next point, which is the materials to be used in teaching agriculture. Those things which are at hand are the things which should be used. I am speaking of the one-roomed school out by the cross-roads where we went to school. We must observe the birds, trees and flowers, the material things. These are the beginning, the fundamental things. You must awaken an interest in the children in these things. This is very interesting, if you will only get into it. You will not find a teacher who has been attempting to do some of this work along nature study lines who is not enthusiastic about and in it, and they have found that it has helped them wonderfully in all their work. You will find that you can awaken an interest in the boy that is slow, and probably find that he does know something; they know things which are not learned in books and sometimes they know things which the teacher has never thought about. Now, after we have established this ground work—it may have been imperfectly done—we will not wait longer, but we will come to the consideration of the farm life, the things with which the boys and girls work and about which they are particularly concerned. There is the soil, and the live stock on the farm. Our boys need to know about these things more, for there is much that they do not know. Soil may be studied in the school room, or it may be studied in the field. I would prefer to study it in the field. Our boys and girls do not understand very clearly; in fact, most of them do not know at all the difference between the clay loam and the sand; they do not understand what muck soil is. Now these are the things which our boys and girls should know; they should certainly know the difference in the construction of the soils. Here are the farm crops growing throughout the given neighborhood. The pupils do not seem to know why the farmers raise these crops. Is

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there any reason why the farmer puts this crop in this field, and another crop in another field, and another crop on another type of soil? Is there any reason why the farmer grows corn on the field one year and wheat another year, or oats another year, and follows this with clover? Is there any reason for this? What does it amount to? What do you suppose is the reason for it? These are facts to be investigated. Now these facts gathered together after a while make a large fund of information, and the pupils will get to see that there is a great deal in farm life that they have never thought of. What about the live stock about the community here? There are all kinds of live stock. Can you tell me anything about the live stock, and the different breeds? Do you know how many different breeds are raised in your community? How many different varieties of chickens are raised in your neighborhood? Is there any reason for all of this difference? What is the reason that one farmer raises shorthorn cattle and another raises Jerseys? Is there any difference in the formation of these animals? Our boys and girls have not stopped to think that there is any difference as they go along, and yet they have seen these animals many different times in their lives. We want to bring these things to the attention of our boys. Now these are some of the materials that are to be used in teaching agriculture in our public schools.

Now a great deal has been said about a text-book. I do not believe that we should stick to a text-book altogether, for it is only meant to be a helpful guide. Most of our text-books have been prepared by men who know more about the subjects than you or I know. Now, in the colleges and universities our text-books are only meant as a guide, a systematic help to us, and we are only to follow them, and with the help of the instructor they will lead the class along. The good instructor always supplements something which is not in the text-book. We must do a lot of reading outside of our text-books. A teacher that does not have this done makes a mistake. A great many text-books have been prepared on agricultural subjects, and some are good and some are bad and some indifferent, but we are still making text-books in agriculture. You will notice that in every magazine that comes to your desk there is something that tells you about these books, or some pamphlet that has been written along some of these nature study lines. The best brain of our country is at work on these particular things at this time and they are turning out a great many text-books and we shall see better ones come out from year to year. We must not rely on the text-books too much, but must study out these things and see if they are true by observation of the things in the field or wherever they may be found. Now, the matter of apparatus need not bother the teacher. A Babcock tester will only cost four or five dollars, and a great deal can be devised by the teacher, so that the matter of ap-

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paratus need not trouble us; but it will have to be relegated to the consolidated schools or the smaller high schools; but the larger the high school the more apparatus they will have. I want to say that the consolidated school will offer in that connection greater opportunity for the use of apparatus. There will be laboratory facilities and a room that can be used for laboratory work and where the experiments can be carried on. Where there is only a single room the school grounds may be used in a great many instances. A great deal can be done to improve the ground if nothing more, a great deal in the way of planting hardy plants or shrubbery which will make the grounds much more beautiful, and they will be of interest to the children.

I wish to make another point, not exactly included in my subject, but it is astonishing how few of the farmers have thought it worth while to beautify the grounds where they are living—the grounds about the house—and yet they have been living and will live there all of their lives! Is it any wonder that the boys and girls do not want to stay at home? Look at the surroundings on so many of our farms? If you could get away I think you would want to come to the hotel to stay over night, no matter how far it was away. These things should be thought about.

Now in the high schools there should be a room where specimens could be gathered together, and they would be very helpful in teaching agriculture and a great many other things.

Most teachers in the country find that they can find well-bred animals to study and to use in teaching about live stock. The pupils can see these animals together and see their good points and their differences. A teacher is fortunate who is put in a community where they have well-bred animals, for such a community is sure to be interested in the work of the school along this line. The teacher who will take hold of that material and use it will find his or her work lightened a great deal. I should like to teach in the country schools in a community where some of you men and women live. I think that the boys and girls would know more about apples and other fruits before next April than they do now, for I would invite you to come in every once in a while, bring some apples with you, any say something about them. Would you refuse? Would you admit that you were not willing to stand up and tell your brothers in the work what you knew about apples and other fruits? Would you be afraid to stand before a company of children and give them the information which you have about fruit? I do not think that you would. Several times during the term I would have one of the successful farmers of the country come in and tell the boys and girls something about the work which they are doing.

Now, as to the time that is to be given to this work. Every teacher will say that his or her programme is already too full, and too much

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crowded, for they are to hear from twenty-five to thirty recitations a day. This is the way it always is; it used to be that way when I taught school and I suppose it always will be. Now to the curriculum which we used to have they have added music and scientific temperance and literature, and I do not know what else; they have added those things since I quit the business, and I have quit the business since a great many of you have.

In the single-roomed school we cannot expect to have agriculture in every grade nor expect to have daily recitations in every grade. Our teachers have been studying a good deal about correlation, and they have tried to correlate history with geography, etc. There is no subject that will correlate quite so well as agriculture will. It will furnish problems in arithmetic, it will help you out in geography, and is fine for composition work. Why is it that children do not usually like composition work? It is because they are given such abstract things to write about. You want them to write on some moral subject and boys and girls in school are not ready to moralize very much, and if you would ask them about something they know something about it would be very much easier for them and you would have no trouble in getting them to write compositions. You know that you can talk much better about something that you are interested in. You could talk for an hour or more about apples, strawberries or other things, and you would write about those things if you thought any one would read what you had written, and you would be glad to write about it. Just so with the boys and girls. If you will ask them to write about something that they know something about and are interested in, you will find that they will be glad to write compositions. It is not such a hard thing to do after all.

In the seventh or eighth grade, perhaps, one period a week is enough to teach agriculture, especially in the one-room school. Do you remember the time when you used to devote Friday afternoon to spelling matches or something of that kind, for on that afternoon you couldn't keep order and the pupils looked forward to that time to have a good time? Now that time was almost wasted and you might use that time to have a lesson in agriculture, for it could not turn out worse than the other, and it would be an attempt in the right way. When we come to consolidated school and the high school we could have more time for this, for there are fewer classes and more time to hear the class and more apparatus to use, and a better apportunity all around, and a better opportunity to break the routine of the school-room. Take the boys and girls out in the open and study these things. When we come to the high school we have apparatus for more scientific work and we do the work more thoroughly and more systematically. I would say that lessons might be given twice a week without harm, but I would not think of giving them oftener than

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that. If you give this work twice a week throughout the year you have added a great deal of information to the children's fund of knowledge, and the boys and girls will go out into life having more interest in the farm and the things which surround it. The important thing which we want to do is to interest the boys and girls in their surroundings. in their farm life and in the common things. Remember this: teachers will not all be good, and it seems to me that the teachers in the city school are more interested in industrial education than those in the country, and in manual training work and in domestic science and agricultural work. It does not seem right that our country schools should be behind in the things in which they are mostly concerned about, but it is true. So I say that this work should be taught, not only to the boys and girls in the country, but in the city as well, and it will be helpful in making better men and women in the future because boys and girls in the country will have a different idea of their work, and they will see the dignity of their labor in a way in which they have never seen it before, and the city boys and girls will appreciate country life more than before, and the two sets of children will come together in a way in which they have never come together before. All of the boys and girls in the country will not live on farms, and all of the children in the city will not live in the city. Did this ever strike you? We will see more from the city go into the country than in the past, and I do not know that we will see more from the country go to the city, but we will see a difference from what we have seen in the past, and it will be helpful and beneficial to the country. We want to give our boys and girls this modern view of life; we want to give them an idea of the dignity of agricultural work and show them that it is based upon things they have never thought of before. This will make better citizens and we will have a more educated commonwealth and it will help life up all along the line. (Applause.)

President Swaim—We have persons here who have had several years' experience in teaching among the farmers and in our farmers' institutes along something of this line, and we would be very much pleased to hear a few words from Mrs. Romine of Mooresville.

Mrs. Romine—I do not want to disturb any one's nap or send any one away, and as I am not on the programme for this evening I will only take a few minutes of your time, but I, woman like, cannot resist the temptation to get up and say a few words every time I am called upon.

When you talk of agriculture for the rural schools you take it for granted that all men are more less interested in agriculture. There are things which could be taught in the country school more easily than

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in the town school. They tell us that men are interested in domestic science. I know it, for I know that the proverbial way to win a man is through his stomach, and the way to his intelligence, I believe, is through domestic science.

In this connection I want to say just a word in favor of domestic science in the public schools. It means an uplifting of the ideals of home; it means giving women a new ideal of their relation to the government. That seems a long step, does it not? Every woman is a citizen and a very important factor in the world, because women are home makers and women are the ones who establish the ideals of home and no nation ever rises above the home ideals. We talk of temperance unions and try to prohibit intemperance and try to pull men out of the gutter or ditch and get them to stop drinking, when, perhaps, at the same time, the women are feeding them food which gives them a craving for these stimulants, and then they are trying to pray them out of being drunkards. I think it is very important that you give them proper food. Some people think that there is no relation between this at all, but there is a distinct relation between good food and intemperance and good food and morals. We sit up and talk about having domestic science in our schools, but we do not have it, and the real reason that you do not get it is because you do not want it. That is the real secret. If you wanted it badly enough you would not consider the cost of this great educational problem. There is a great deal in the teaching of morals and right living, and if you would count the dollars and cents you would find it would be far more economical to teach right living in the public schools. You will have it taught when you want it badly enough, for you will get together on this problem and help solve it, and you will see that it is put into the colleges and the universities. You remember that agriculture was not taught in the public institutions until the last few years, and now it is taught in the state normal and other places. Just reflect how long you were getting it, and what a fight there was for it! Until we teach domestic science no woman's education will be complete. She must understand the principles of home making. A woman should know how to apply chemistry and botany and physics in the household in her every-day tasks. There is something the matter now because we do not dignify labor connected with housekeeping. It seems that girls will go into any other line of work but housework, and those of you who are overworked and have more than you can do, know that you cannot get a girl to help you. Is it because there are no girls who need to earn their living? Is that it? No, indeed. The factory has a long list waiting for employment; the stores have a long list in waiting, but these girls will not come into the kitchen, because, forsooth, the woman who works in the kitchen is looked down upon. And that

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is true. This is a great shame, because out of food we convert thought and energy, and should we have a girl in our kitchen who has not been trained for this work? Wo do not require that she shall have any training at all. It is not necessary that she shall even know how to wash the dishes or that she shall know anything about preparing foods. So many housewives do not know how themselves and how could they require of the kitchen girl something which they do not know themselves. We have no standard in the home except the standard of each woman in her own house. Every girl should be taught (and would enjoy) home making from the time she could walk, and some attention is given this by affording little playthings for her, but when you put her into the public school you ignore it entirely. You ignore the fact that she should be trained in housework, or that she should be trained in the kitchen, and that she would enjoy housework. Every girl shows signs from the time she can walk of a liking for this, and yet you ignore it. You send her clear through high school and college without ever a word about domestic science, and then when she is through you think she ought to care for washing dishes and sweeping and darning and cooking. And why should she care for it? A great deal of our housework is considered menial, and the reason it is menial is because we go about it in a menial spirit, because we do not take pride and pleasure in it. We have never taken pride and pleasure in our housework because it has never occurred to us that there is anything in it.

I want to say a few more words, and then I will stop talking, not because I have nothing more to say, because I have such a mouthful of words I hardly know when to stop, but I will stop because some one else may want to talk. I want to say that there is a distinct relation between the dignity of labor and morals. There is a serious question confronting you when you send a boy or girl into a school to be educated, for fear they will not get the right idea of work. We look down upon all work, all kinds, not only housework, but others. I mean that we look upon it as a thing to avoid if you can and not a necessary God-given blessing when rightly applied. We should not do this and it should be a part of our daily training from the time we begin school life to teach the children the dignity and the divine origin of labor, and when you are talking about agriculture in the public schools do not forget domestic science. When you are talking about manual training for boys do not forget manual training for girls, which means domestic science. This does not mean a cooking school. I go around with a chip on my shoulder all the time about this cooking school. One time when I had a class in domestic science I happened to be sitting at the breakfast table with an old gentleman who had studied the Bible all of his days. He knew a great deal about the

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Bible. He was talking to me one morning about a cooking school, and I told him that I did not know what he meant. He asked me if I was not the teacher at the cooking school there, and I told him that I was not. He asked me if I did not have a class at the cooking school every afternoon, and I told him that I did not have a cooking class, I had a domestic science class. He asked me what the difference was. I explained to him somewhat at length—for he was at the breakfast table, you know, and could not very easily slip away—and when I got through he said that he did not know that there was any difference between the two, and that he thought that women knew instinctively how to keep house. Now he knew everything about the Bible, but it was evident that he did not know anything about housekeeping and yet he was a learned man. I suppose that things went along so smoothly at his own house he hadn't been disturbed. It matters not what you are talking about, good results are only obtained with definite knowledge, and the same is true of washing dishes, ironing, sweeping, dusting, etc., because there are distinct principles involved in each and that is why we want to give the girls an opportunity to learn these things and then the condition of things will be changed and you will not have to be hunting for some one to assist you with the housework as you have to now, and we will be a healthier, happier people. More of the girls that are going to the factory will be working in homes and they will respect the work of the kitchen, and because she respects the work of the kitchen, you will respect her. This is the secret of the lack of respect; that is why housework is looked down upon. You must bring it on a level with other professions. (Applause.)

President Swaim—This subject is indeed an interesting one and I do not wish to go on without calling for another gentleman present, Mr. Allen, of the Manual Training High School of Indianapolis. A word from him, I am sure, will be appreciated.

Mr. Allen—Ladies and Gentlemen: The subject of industrial training is so large, it covers so many fields, that it is hard work to mention anything that would not come into the industrial life of every person. We have heard something about agriculture and something about domestic science. I agree with those who have spoken that for the boy agriculture is probably the best thing he can study, and for the girl, no matter whether she lives in the city or country, domestic science is the best thing that she can study. For a great many reasons this is true. There are other things that come into the life of the children that should be taken up in the school, and I feel that the reason that so many of you, as parents and patrons of the school, do not take a little interest in this industrial work, is because the whole thing is so much "in the air." You are educa-

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ting your children away from you and have been all of your lives. Boys and girls come to me and do not know how to use the arithmetic they have learned in school; they cannot use it in figuring the cost of a bill of lumber; they never seem to think of anything in the concrete, but only in the abstract. They know the foot and the yard in their arithmetic but not the actual foot and yard.

Now if you will pardon a personal illustration—I learned a mechanical trade in the shop. I stood back of the machine for four years, four long years, and learned it by the method of "picking it up in the shop." I am one of a very few young men who has served a contract apprenticeship. You cannot do this in the shop now, for they cannot make money enough out of you. You must do piece work. They put you in one place and let you stay there and do one thing. Simply make a machine out of you. You only know how to do one thing and you get the wages of a boy—three dollars a week, or, maybe five. You grow beyond a boy's necessities, but you stay on his wages. There is where the dangerous element in this country comes from. The boy of eighteen who leaves the factory, or the man of eighteen with only the boy's ability for the factory will not make a mechanic, and the farm will not make an agriculturist. He can make the soil, possibly, raise ten or twelve bushels of wheat. Why? Because nature is generous enough to do this. Is this boy handicapped? He certainly is.

Now the child on the farm of fourteen or fifteen years cannot see or seem to realize that there is any relation between the cow and the automobile! Now doesn't that seem like a contradictory statement? Just look at the upholstering that is in the seats of these machines and think of the cowhides they have required to make these! The farmer is the most independent man on earth. There is no other business that can be carried on by itself as can the farming industry. You can be absolutely independent if you live on the farm. You should talk and teach agriculture to our boys and domestic science to our girls, and you should show them that are then learning the underlying principles of all industry. We do not realize that the foundations of our government are laid in the country school. Industrial training interests the children. I have come to the place in my school work where I do not have to ask my boys a question. I have them interested and they go to work, and when I come around, they are asking me questions. I do not have to stand them up and question them for half an hour to find out just where their weak point is, but they do the question asking and in that way I can help them just where they need the help. It is hardly possible for me to be around but what I am asked questions by my boys. This reminds me of a story I heard once. The slave whom I am going to speak about happened to be

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fortunate enough to have a very good master. Finally, this slave was freed by law. He got a little plot of ground near his master's and one night his old master happened to come along and found him working away and he said to him: "What is the difference between a free man and a slave? When you were a slave you would have gone home two hours ago, and I gave you a nice, comfortable cottage instead of the dry goods box which you now occupy and you would have been home long ago instead of working here. What is the difference?" The colored man looked up and said, "Master, it is the difference between working and being worked." Now that is the difference in the schoolroom. We have been training the boys how to work and teaching them the underlying principles which dignify that work and make them love it and will brighten their lives. If you take a tree and put it in the house it will turn toward the sunlight and if you keep it there long enough without sunshine it will die. If a seed happens to fall into a weed patch it will die, unless it is cultivated and the weeds are kept in check for a while until the seed gets above the surrounding weeds and then the weeds can not kill it. Just so, the boy must be so educated that when he leaves school he will be enabled to appreciate the pleasures of employment and step into the warm sunshine in life and will realize that he is in the cultivated field.

(Applause.)

President Swaim—I think that we will have to leave this subject. Mr. Fox, of Indianapolis, who has been in the Pacific region, wishes to tell you something about the western apples.

Mr. Fox—I wish to tell you something about something that I do not know anything about myself, for I never raised an apple except some Ben Davis that I picked from the ground and took to the railroad station and sold for twenty-eight cents a bushel. I got enthusiastic and tried to grow an orchard, but I was not successful, for I was not smart enough to do it. I sold my farm. I am sorry that I cannot tell you from experience how to raise apples, but I can not; but I can tell you some things that I have observed in the western apple country. In this country, on account of natural conditions, they say that they can raise better apples than can be raised in any other part of this country. Now the talk of these people is very strong for their apples, but like all western talk, there is some allowance to be made; but they do make money from them.

I started out with a commission for six carloads of apples, and I stopped at the town which was the headquarters of the apple growers' union or organization, and all the sales were through or by a manager. The growers have a rather close corporation, and they do as they are

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told. I wrote to the manager that I was prepared to receive an offer for six carloads of apples of various kinds, and I asked him to tell me what he would do. I also wrote to another concern, the D——— Fruit Company, and waited for two or three weeks and did not get a reply, and in two or three days after that I got a letter from the manager of the first concern, in which he told me that he had received my letter, and said that he was enclosing a circular, and that circular stated that most of the apples belonging to the union had been sold, but he stated that he was ready to receive bids on the remaining apples—for the whole or any part of it. That seemed to me a strange way, but he told me that the bids were to be directed to the First National Bank and that they would be opened the third of September. Well, did you ever hear of anything like that? Did you ever hear of sending in your bids to buy apples? If you had a horse for sale would you tell your friends that you were ready to receive bids? I had been in business for a number of years and had run up against a great many people, but I had never run up against anything like this before. I thought this must be a fake. I did not answer the letter, but I waited about a week after the bids were to be opened and went down there. I felt confident I could get all of the apples I wanted out of those forty-four thousand boxes that were in the union. I went over to the town and to the warehouse—a very large one—and found it empty. I went to the office, and the manager was there, idle, and the stenographer was doing nothing, and I walked in and introduced myself and the manager recognized me. I asked him if he had any apples, and he told me they were all sold. He told me that there were twenty-one bids, and they were from England, from Scotland, and from New York, Chicago, and San Francisco and various other places, and that one man bought all of the apples, and he bought them for a New York firm.

As to the price, that is a secret. They had some trouble several years ago on account of letting it out as to just what the apples were sold for, and they do not let it be known now, for when it was told, some people went among the union people and told them that they would give them five or ten cents a box more, and some pulled out and lost their connection with the union, and ever since that the price has been kept a secret until the apples are shipped. Of course this is an off year, but they got a dollar and seventy-five cents a box for Ben Davis, and from two to two and a quarter for Jonathans, a little more for the Baldwins, two seventy-five for the Newton Pippins, and more for the Spitzenbergs. These were all shipped.

They have learned that the best apples for them to grow are the Spitzenberg and the Newton Pippin. They have no rain from October to May, or rather they have no rain from May until October or November.

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They irrigate their orchards about twice a month to keep them moist. They keep them clean. There is not a spray of grass or other plant in them, and there is not an apple on the ground. They pick up the apples every morning. They spray twice in the winter for the San Jose scale, and that is the worst thing they have to contend with, according to most of them. They have gasoline outfits with two runs of hose to the wagon. The trees do not grow very high, and there are hardly any over twelve to fourteen feet. They prune them with the base of the tops two and one-half feet from the ground. They have been topped, as a rule. This man has no props in his orchard, but supports from the center with a ring and hooks on the limbs and this keeps them from breaking down. They spray from four to six times during the summer time, mostly six times. I was in this orchard a year ago when they were gathering apples or having them gathered, rather, and I heard him offer the women five cents each for every worm hole they would find in the apples, and they did not get anything.

Now the man who raises the apples has nothing to do with picking them. The union sends out the pickers, and first they select only the perfect apples. When they are assorting these apples if they find one that has the least thing wrong with it it is thrown aside. When the apples come to the market they do not have to be opened to see if they are all right or not, but they are branded and you can depend on the marking. They will be marked: "This contains eighty-four apples," and "this contains one hnudred and twenty-five apples," etc.

Besides the climate, the soil and the sun they have the organization, and that is the greatest factor they have in making their profit. If it were not for this organization they could not get the prices they do. They are known for the genuineness of their packages, which are guaranteed.

After the apples are shipped the members of the union get their money. I bought some apples of a man named Cameron, and got acquainted with him and was in his orchard. I saw a number of fine apples on the ground and I asked him why they were there. He told me that he could not get boxes for them before they had fallen off the tree. I asked him what he was getting for them and he told me that he was selling them for seventy-five cents a gunny sack, and I am sure that two-thirds of them were not injured at all. They had fallen on the soft ground, and the limbs were low. This man didn't belong to any union, but for his perfect apples he got the same price that the union got. I bought some apples from him for my son at seventy-five cents a gunny sack—one and one-half bushels.

I was in another orchard in that neighborhod, but it was not so good. This man's name was Michaelson, and on one limb I saw twenty-six apples

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within a foot. I afterward went to this man to get some apples to bring home with me and he was trying to peddle them out at a dollar and a quarter a box. That is the difference in the men. They had the same sort of soil—only two and a half miles apart—but he was not an orchard man. It wasn't in him. I saw some of his apple trees broken down. He would not thin them and for the sake of a few apples allowed the trees to break down.

I saw another orchard belonging to Mortica Jones, an Englishman, who spends about one-half of his time in Europe. He has sixty acres. He has his orchard in the care of another man, who looks over the apples and sells them. I saw trees there that were dying, and I examined them and found that on the west side the bark had come loose. I asked about this and it developed that they have a great deal of sun in the winter time and it starts the sap running and then it freezes at night and the tree dies. I think Mr. Jones, too, was raising apples by proxy. I do not think he will have a great amount of money to come to him. These orchards are developed largely by people who are natives. Some are in there from the wheat farms, and a great many of them are from the towns.

I met a traveling man for a large house, who bought ten acres of land and set it out; he paid one hundred and fifty dollars an acre for it; the balance of the land was not cleared. Now that man will have to work for the next four or five years. His wife will not get to attend any card parties or any clubs and she will have to be a strong helpmate to him if he is a success. I wanted to talk of this, because this afternoon something was said about the young men going out of this country to the west and coming back home broken down. They have to take it in the rough. It costs from seventy-five to one hundred dollars an acre to clear the land, and twenty acres is as much as one man can look after, and even then he has to have assistance in cultivating and taking care of the orchard outside of doing the picking. This is a big proposition. This man Mason has twenty-five acres. He is building a fruit house capable of holding eight thousand boxes. I think he will have that when all of his orchard gets into bearing, and probably more, too, a great many seasons, and this means eight or ten thousand dollars net off that twenty-five acres. But it is a long way to that. These men that come in and take the land in the rough—take the government land, for instance, it will take three years before they can get ready to plant an orchard, and it will be ten years before they get any remunerative results, and it means a pioneer life with its hardships and it takes a great deal of backbone, more than the average young man who lives here has. After he has stuck it out he has something. I have lived here in Indianapolis for fifty-four years

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and I intend to stay here; that is a young man's country out there. I want to make you in Indiana acquainted with their method of picking and handling fruit and selling it. In my younger days I knew a farmer, and he was also a politician, who certainly knew how to dispose of such apples as his. He never sold them twice at the same place, however. That is not the way. Get in your good work, brother. You want to study this and make a science of it. In ten years from now there will be great changes in this line. It is a matter of education and it is going on in regard to the raising of the apple. The most important thing that I know of is to keep your neighbors and yourself from putting small apples into the middle of the barrel and nice ones at the ends. This is a sample of what I got in one of those barrels (shows some very undersized, scabby apples). They were fine on top, but just look here. What is your basis of Indiana apples? What reputation will the state have? Many of the Illinois apples and the New York apples are like that. Do you think they would be able to sell them the second time? I have seen our apples last year at the commission houses selling for a dollar and a quarter when the New York State apples were selling for three dollars and three and a half dollars. If you sell them at home when dishonestly packed it injures all of your apples, and it injures the reputation of the man who put them in the barrel. I would not sell my apples unless I put my name on the box, and if you do this you will get a reputation, then you can get the price. Indiana is a fine place to grow apples, but you must attend to the packing honestly. This thing resolves itself into dollars and cents. You would have the satisfaction of knowing that the apple tree is helping you; it will help you get rich if you will take care of it and are honest in your packing.

When I first commenced traveling up and down this state twenty-five or thirty years ago, there were some apple trees in parts of the state in good condition, but in many instances I saw them standing out in the field with no fence around them sometimes; there were dead limbs hanging to the tree, and there were holes around the roots of the tree where the hogs had been digging, and the cattle made rubbing posts out of the trees, and I confess to you that I would not be able to look an apple tree in the face if I treated it that way. I am speaking of apples or apple trees that have been grown in this country for generations. It is a shame that when you can raise as good merchantable apples as are to be raised in any of the states that you do not give it your time and attention. A man must have some enthusiasm in it and like it in order to succeed. I think this is all I have to say.

Applause.

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Mr. Zion—There was an attempt made in the last legislature to do away with the San Jose scale, but on account of opposition it was defeated. I would like to ask this gentleman if they did not use strong methods to rid themselves of this scale in the country he is speaking about.

Mr. Fox—The subject is so large that I could not speak on it at any length. I have never talked before to a large audience and I felt very weak when I was sitting back in the audience and listening to the other speakers, and therefore there were a great many things which I did not touch upon. There were some things that might have been of interest to you and your growers. I think in the State of Washington that they have a right to refuse to allow a tree to be set out if it is affected with the San Jose scale, or any other pest, for I think that the San Jose scale is the least thing they have to contend with. It is the easiest to overcome. They have an inspector there.

Mr. Zion—They have a stringent law in force in California and Washington, do they not?

Mr. Fox—Yes, I think so.

Mr. Zion—Well, we want that same law here in Indiana.

President Swaim—Tomorrow the first thing on the program will be the part of this evening's program which we have omitted on account of lack of time, and after that we will follow the program as it is laid down here. We will now adjourn and meet in a social capacity. Mr. Flick, our secretary, has provided two barrels fine Indiana apples for our observation and consumption.

Now you may consider yourselves at liberty to enjoy some of the good apples which are in store for you. Do not feel backward, but feel perfectly at home. Let every one speak to every one else. No introductions necessary.

The meeting then stood adjourned until 9:30 o'clock on Thursday morning.

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THIRD SESSION.

President Swaim—The time is here for our opening this morning. We will take up the work where we left off. The first thing this morning will be "In Memorial of J. C. Teas," report of committee by W. H. Ragan, chairman:

IN MEMORIAM—JOHN C. TEAS.

But recently I stood by the grave of John Howard Payne, with its sculptored marble and its picturesque surroundings, and there I saw a Weeping Mulberry, through which I was reminded of its distinguished originator, whose death we mourn and whose memory we today honor and celebrate as a founder of this Society. John C. Teas will ever be remembered as one who contributed his full share toward beautifying and making better this world of ours. His creation and preservation of the Weeping Mulberry, a specimen of which now adorns the last resting place of the poet who left us the immortal ballad, "Home, Sweet Home," is but one of the many contributions he gave us while sojourning on earth. It is related of him that at the tender age of ten years he had his garden in which he planted and cared for his favorite trees and shrubs, among which was not a few young apple trees, seemingly preparatory for the orchards to come. Seeing this inclination of the youth, and realizing that the then price of apples was but ten cents per bushel, a pessimistic friend cautioned him against the danger of overdoing the apple business to the extent of completely breaking down the markets, when the numerous trees, the product of his handicraft, should come fully into bearing. But, notwithstanding this friendly caution, he steadily pursued the bent of his early inclinations and in spite of the great increase in orchard planting, lived to see the price of apples steadily advance, until it now exceeds by more than ten-fold the average price of apples when he, as a boy, decided to join the tree-growing fraternity.

John C. Teas, a native Indianian, was born of Friends (Quaker) parentage, in 1827, and remained a resident in eastern Indiana until 1869, when he removed to Carthage, Mo., where he continued to live until his death, which occurred on July 29, 1907, having lived to the unusual age of eighty years. He was a most industrious, intelligent man, and, having lived so long, accomplished more than is usual with mortal man.

The writer, in the "Report of the Memorial and Obituary Committee" of the American Pomological Society, at its Kansas City meeting in September, 1905, took occasion to add a "tribute to the living," in which he said: "Having placed laurel wreaths on the graves of our worthy dead, [illegible] estow a word of justly merited praise on a few of our living [illegible] we debts of gratitude." In this list he included the name

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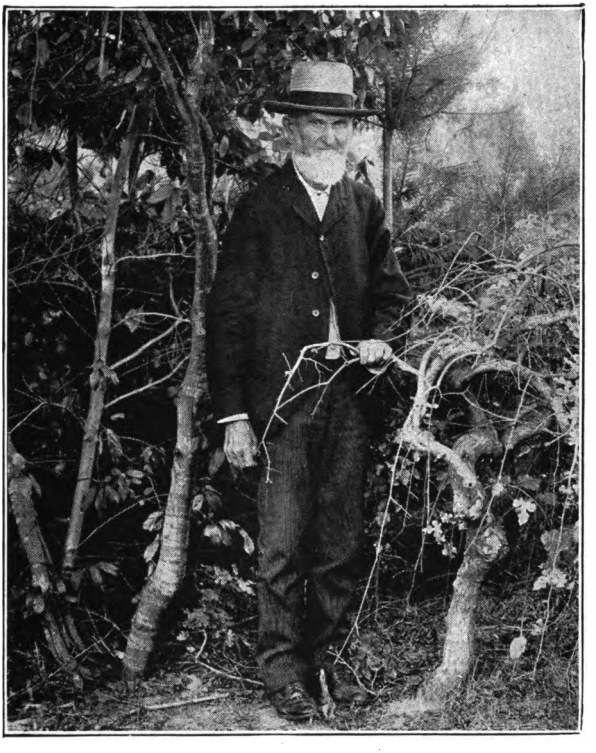

JOHN C. TEAS APPEARS STANDING BY HIS WEEPING MULBERRY TREE.

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of John C. Teas, in the following words: "John C. Teas, of Missouri, but formerly of Indiana, was an early participant in the affairs of this (The American Pomological) Society, and during a long and useful life has stood in the frant rank among our best and most worthy horticulturists. In a recent letter from him, one of those characteristic letters that he alone can write, he said he was never busier in his life and that he was now rapidly nearing his eightieth milestone in life's journey."

Mr. Teas attended the meeting of the American Pomological Society at Rochester, N. Y., in September, 1856. For a number of years thereafter he kept in touch with the society and generally as an official representative of our state. He was also well known to and often quoted by Downing in his "Fruits and Fruit Trees of America," as early as the edition of 1857 and in subsequent editions; by Elliott in his "Fruit Book" in 1854; by Warder in his "American Pomology-Apples" in 1867, and indeed by all American authors of note of recent years. He was also a frequent contributor to the current literature of horticulture and pomology and his articles were always terse, instructive and readable. He was one of the first to recognize the good qualities of the Catalpa speciosa and at all times advocated the careful conservation of our natural forests, and the planting and care of new forests to supply the rapidly diminishing forests of nature's planting. He was an early and constant promoter of floriculture and was the originator and introducer of many new and valuable novelties in all branches of horticulture, including pomology, forestry, floriculture, etc.

THE PART HE TOOK IN THE ORGANIZATION AND PROMOTION OF THE INDIANA, HORTICULTURAL SOCIETY.

On October 18 and 19, 1860, he participated in the organization of the Indiana Horticultural Society. In the makeup of its officers he was elected treasurer, in which capacity he served, by continuous re-election, for a term of four years. His participation in its discussions were always characterized by wisdom and a thorough knowledge of the subject in hand. As a pomologist, thoroughly familiar with varieties and their places as to quality, etc., we have scarcely had a member better posted and whose judgment stood higher than did his, and in the ornamental branch of horticulture none was his superior and few his equal. This fact, if not before known and acknowledged, has been made to appear in the highly complimentary mortuary notices that have appeared in the Florist's Exchange, the American Florist, and other journals devoted to the calling to which he contributed so much while living. In consideration of his noble character, his high attainments as a citizen and horticulturist, his many virtues and his Christian life, we therefore offer the following:

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Resolved, That in the death of John C. Teas, we, as members, and this Society as an organization, have sustained an irreparable loss.

Resolved, That the secretary of this Society be and he is hereby directed to make a proper record of these proceedings; also that he send certified copies to the family of our deceased brother and friend; and further, that his portrait, in connection with the original Teas' Weeping Mulberry, be reproduced as a fronspiece to the forthcoming volume of transactions of this Society.

W. H. RAGAN.
SYLVESTER JOHNSON.

(Vice-President Reed in the chair.)

Mr. Ragan—I move that we adopt this resolution.

Mr. Hobbs—I second the motion.

Vice-President Reed—You have heard the motion. All in favor of it make it known by the usual sign.

The motion was voted on and carried.

Vice-President Reed—The next thing on the programme is "Modern Methods in Strawberry Culture in Indiana," by E. J. Walker, of Sheridan. Is Mr. Walker present?

Vice-President Reed—In the absence of Mr. Walker we will call the next, which is "Modern Methods of Growing Seed Potatoes," by J. D. Nysewander, of Bridgeport, Indiana.

MODERN METHODS IN GROWING SEED POTATOES.

BY J. D. NYSEWANDER, BRIDGEPORT, INDIANA.

Mr. Nysewander—Mr. President, Ladies and Gentlemen: I am to speak to you today upon modern methods in the growing of seed potatoes. The last twenty years have marked a great advance in the production of garden and farm seeds. The great seed houses of today, or at least some of them, were in their infancy thirty years ago. The Vaughn seed stores of Chicago and New York issued their first annual catalogue thirty years ago, while the great mail order business of W. Altee Burpee was still in swaddling clothes.

Many of these houses now maintain expensive trial grounds, where standard seeds are carefully selected and rogued for purity and vitality, promising novelties tested to determine their value, and new varieties produced by expert breeding. Burpee's bush lima, Henderson's Country Gentleman sweet corn, Livingston's New Stone tomatoes, and the new Gradus or Prosperity pea, are few of many recent introductions of great value to the trucker and gardener.

But the advancement made in the improvement of field corn in the

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last few years has easily broken all records in seed improvement. What with corn exhibits, corn trains, and corn schools, the work done at farmers' institutes and in the public schools, the progress made is little short of marvelous. It is hardly an overtruth to say that where one golden ear grew under pioneer methods of farming, two now shake their silky banners at the happy corn-grower.

The potato has received far less attention than farm and the garden seeds. It is very hard to find any trustworthy data relative to the improvement of the potato for seed purposes. Something over a year ago, the writer, wishing to ascertain what if anything had been done in the way of maintaining or improving the stamina and germinal vigor of potatoes, addressed letters of inquiry to the Department of Agriculture, Washington, D. C., also to many state experiment stations, including those located in the states in which the potato is a staple. In no instance were data bearing on the facts sought received, the tenor of the replies being that no experimental data of the kind wanted were at hand. In a few instances, bulletins bearing on some other points—as diseases of the potato, methods of culture, potato fertilizers and the like—were forwarded, but practically nothing on the question of how to maintain or improve potatoes for seed use.

The fact is that it is not an easy matter to maintain the stamina, and still more difficult to improve it. Where the natural conditions of soil and climate are favorable, with drainage sufficient for all ordinary weather conditions, it is possible, in my opinion, to maintain the stamina of many varieties of potato indefinitely. On the other hand, if these natural conditions are lacking, the best possible care of the crop will not suffice to prevent gradual degeneration. One obstacle in the way of the improvement of the potato through the tuber is that the latter is not a seed, and that therefore the principles of breeding in any true sense are not applicable. Such terms as "thoroughbred," "pedigree," and the like, are merely hot-air advertising intended as bait for the unwary. Later on something will be said about tuber selection as a means of varietal changes or improvement.

Modern methods in the growing of seed potatoes is in the main a summary of the writer's experience in the business. Nothing of authority is claimed for it, and questions and criticisms are cordially invited both during the reading and at its close.

Starting with the seed in the storage cellars, the potatoes are run through an assorter to remove "nubs, scabs, roughs," etc.; placed in bushel crates and immersed in a corrosive sublimate bath. After removal they may be permitted to dry in the crates, or, if wanted at once, spread out on a dry floor under cover, with a good air circulation over them.

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After cutting, the sets should be planted at once, if possible. If not used at once the seeds should be spread thinly under cover and well ventilated. In either case the sets should be well dusted with land plaster; not lime. The seeds should be taken to the field in crates or boxes; never in bags or loose in the wagon. Under no circumstances should the sets be allowed to get wet. If the directions are not observed, the acid on the sets is likely to be dissolved and serious injury result. I have seen good seed entirely ruined by careless handling. While the directions given apply particularly to seed that has received the sublimate bath, it represents in general the safest practice in handling it.

Cutting the seed is one of the most important steps in growing the potato, whether for seed or commercial purposes.

How to cut them? Science and facts, not custom, must be the guide. The end sought is stamina and vitality and as a sequence crop yield. Let us examine the potato for the facts. It is called a tuber, composed principally of starch; is studded with germs, or eyes, forming a cluster at the rose or seed end and diminishing in number toward the stem. Furthermore, it is a fact of common knowledge that the strongest eyes are at the seed end and that germinal vigor diminishes toward the stem, germs near the stem often failing to grow under the most favorable conditions. It is evident, therefore, that the tuber should be so cut that the sets should have at least one "eye" from the "rose" end. Several would be better.

Now as to the science. Nature favors the strongest. If the set has but one eye, a natural law is violated; if cut to two eyes, the selective principle has a limited choice; if there are several eyes, the strongest will be favored. One practice is as follows: Tubers from two ounces (about the size of a hen's egg) to medium size, are preferred. The smaller sizes are divided into halves, cutting from "rose" end to stem; middle sizes are divided into thirds by cutting obliquely from "rose" surface to stem, while the larger potatoes are quartered, the method depending upon the form of the tuber. If round, or nearly so, from "rose" end to the stem, as in the case of the small tubers; if the tuber is oblong, a portion of the stem end may be discarded.

Cutting to one eye is in violation of both science and known facts; cutting to two eyes is open to the same objection in a less degree; cutting sets from the seed end or cutting away the germ cluster at the "rose" end is reversing both science and facts, the weaker germs being chosen, the stronger discarded.

Now, where the law and the fact are both against the offender he is very likely to suffer the penalty, which, in this case, is poor germination, poor stand, poor growth, and poor crop. Moreover, the most vigorous varieties will degenerate rapidly under this practice and will become worthless for seed.

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As having a direct bearing on stamina or germ vigor, I shall discuss briefly certain important details of the industry under consideration, as drainage, soil condition, and preparation, tillage, insects and diseases, etc. Much of what is said under these heads applies equally to the growing of potatoes for commercial usage.

Drainage can hardly be too thorough. I have found it a good practice, where the texture of the subsoil is such as to impede or retard the removal of excess water, to open shallow surface drains to carry it away. These drains are kept open during the growing season. Who has not noticed the larger yield from the slightly elevated row resulting from the back furrow? This difference was especially noticeable with us this year.

New soils are especially suited to the requirements of the potato. Such soils contain plenty of humus, have an open, granular structure, and usually an ample supply of plant food in an available form for the production of large crops. Old soils should have the same lively character as new ones, and in addition be well supplied with soluble foods suited to the potato. The growing of potatoes should never be attempted on poor soils, as the crop is likely to be small, unsalable for table use and unfit for seed.

In preparation of the ground the ideal method is to plow when the soil crumbles as it breaks over the mould-board, so that comparatively little additional fitting is necessary. The repeated tramping of horses where much preparation is necessary compacts the soil and injures it for potatoes. The double action of the plow is only possible where the soil conditions are just right, and plowing should be pushed during this period. The drag should always follow the plow.

A word in passing as to the planting. Shallow planting is best as a rule, although late varieties may be planted deeper. The average should always be shallow. For seed purposes the sets are planted from twelve to fifteen inches apart.

Under normal soil and weather conditions the ground is surface-worked within a week after planting, and again after the plants have broken through the soil and show well above the surface. The tool used is the spike-toothed harrow. The first operation is usually at right angles to the row and the second is the same direction as the row. The object of this cultivation is to prevent the growth of weeds, but as a rule it is beneficial in other ways, as for instance, under drouthy weather conditions it is very effective in conserving moisture.

The second stage of cultivation under normal weather conditions is entirely different from the first. The plant is now well started and the roots have but little extension. Long narrow points or shovels are used and the soil between the rows worked fine and deep, the inside shovels running close to the row. Riding cultivators of the Iron Age type are ad-

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mirably fitted for this work. Successive cultivations follow at intervals of a week, the cultivator being carefully readjusted at each operation to the root-extension of the plant. As this extension is outward and down, the cultivator points should be adjusted to work shallow next to the row and deeper toward the midway line. This readjustment is very important and should receive close inspection. I am reminded of a rather expensive personal experience in this connection. The cultivators had been carefully adjusted and were giving exact results. It was planned to transfer the work to a distant field the next morning. Meanwhile a severe wind storm had beaten the tops flat across the row. The instructions were that the gangs, which of course straddled the row, must be rigidly held at equal distances from the plants. The operator, a well-meaning chucklehead, interpreted the instructions literally, and the results were painful to look at. While the inner points of one gang were tearing up vine and tuber in the straddled row, the outer points of the other gang were just as effective in gouging out root and tuber from an adjoining row. When I arrived on the scene two acres or more had been damaged fully fifty per cent.

Cultivation should be continued until the crop is well matured. If, however, planting should be followed by beating rains so as to compact the soil, the latter should be deeply and thoroughly worked just as soon as possible. The object being to restore the open porous structure of the soil, so that moisture may re-establish circulation and plant nutrition.

In the spring of 1905, the writer planted eleven acres of rather heavy, sandy loam, to Early Ohio potatoes. The ground was in extra fine condition for planting and the weather conditions remained favorable until the plants were well up. Then it began to rain and it continued to rain from day to day, the downfall becoming torrential in character. When the skies cleared and the ground had dried sufficiently to permit of working, it was pretty nearly as hard as the average Michigan road. Circulation and plant nutrition were completely suspended and the plants were threatened with immediate starvation. For days those plants made no appreciable growth, and to put it mildly, the prospect looked blue. Evidently here was a situation that demanded swift and heroic treatment. Two Iron Age cultivators were equipped with long sharp points and set to work, one behind the other, a float bringing up the rear, the draft was a heavy strain on the cultivator, but the soil was thoroughly and finely stirred to a depth of five inches. In a few days plants began to show new life and the subsequent growth was both rapid and strong, the field producing something over fifteen hundred bushels of strong seed, or at the rate of nearly one hundred and forty bushels to the acre.

Should soil compaction take place at a later stage of growth, remedial

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treatment can only be partial; if, after tuber growth is well advanced, very little can be done.

The grower of seed potatoes must know how to deal with the insect pests and fungus diseases to which the potato plant is liable. Prevention rather than cure should be the aim. With few exceptions the attack, whether by insect or disease, is made on the leaves. Hence, the latter should be protected as far as possible in advance of actual injury. Remedial treatment is, generally speaking, merely an expression of the phrase "too late." While it is not the purpose of this paper to go into the physiology of the potato plant, it is pertinent to say that the leaves are essential in the formation of the tuber. They elaborate the starch, hence any deficiency of leaf means a deficiency of tuber. Leaf and yield stand in the vital relation of cause and effect. Moreover, injury to the leaves, while stunting the plant and reducing the yield, saps the vitality of the tuber and impairs the seed value. This fact must always be borne in mind, that good yields of healthy, vigorous potatoes are only possible where the leaf system is kept in thrifty condition during the growing season.

Among the insect enemies of the potato, the Colorado beetle easily takes precedent. In its larval state it is exceedingly voracious, growing rapidly and becoming more destructive with increasing size. Prompt and effective protection must be given to the plants at the first appearance of the young bugs, or irreparable injury is certain to result. It is the habit of the larvae, or young beetles, to feed on the tender growing portions of the plant, thus checking, and if the attack is severe, arresting growth. They not only devour the new leaf growth, but ingest the life juices intended for new growth. This fact explains the deadly character of the injury resulting from even a brief exposure to an attack of this bug. Twenty-four hours exposure to this rapacious insect often reduces the crop yield twenty-five per cent. Think of it, one per cent. an hour. On an estimated crop value of a thousand dollars under normal conditions a loss of one per cent. an hour means forty cents a minute, twenty-four dollars an hour, and two hundred dollars a day. Verily, as a get-poor-quick operator for the unwary potato-grower from the Colorado potato beetle takes the cake.

My practice is to make a daily inspection of the potato field while the eggs are being deposited and as soon as signs of incubation are observed, paris green is promptly applied, care being taken to have every plant protected. Under favorable weather conditions this one application is usually sufficient, scarcely a trace of the bugs being discoverable. If, however, rain follows within a few days, a second application should be given, and where there is much rain additional protection may be necessary. However, the bugs are easily and quickly killed when newly hatched, heavy rains at that period being nearly as destructive as poison. Hence the dust or liquid used for additional protection should contain but little green.

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The cucumber flea beetle sometimes injures the leaves of the potato and is liable to make trouble during the hot, dry weather of mid-summer. This beetle, which is only about one-twentieth of an inch in length, is sometimes very destructive, its methods of attack being to eat minute holes through the leaves. During the continuance of mid-summer drouths, the vines should be looked after for signs of this beetle, and if found present, the vines should be dusted or sprayed with Bordeaux mixture and paris green. The Bordeaux is intended as a preventative of blight, the spores of which may find lodgment in the holes made by the beetle.

Of diseases of the potato, two deserve special mention for their occasional widespread prevalence and destructive nature. The first of these is known as early blight, or leaf spot disease. The conditions favoring early blight are hot, dry weather, poor plant growth, neglected tillage or any other circumstance that is likely to lower the vitality of the plant. A characteristic feature of early blight is the curling of the edge of the leaf, giving it the appearance of tip burn or scale. While early blight usually develops slowly, often giving the plant the appearance of early maturity, it is sometimes very severe, destroying the tops in a few days.

Late blight is a much more serious disease, as it not only kills the plant but rots the tuber. The development of late blight, under favorable conditions of weather, is very rapid, and if rain accompany the destruction of the tops, blight spores may be carried by the water into the ground, where contact may be made with the tuber, causing rot. In the fall of 1905 I saw hundreds of fields where the loss was practically total, rotten and rotting tubers fairly covering the ground.

I had my first serious experience with late blight in the fall of 1905 at Leslie, Michigan. In June of that year seventy-two acres of very good potato land was planted to late varieties of the Carman strain. The growth up to September 1 was fine and the plants appeared unusually thrifty. Tuber growth was progressing rapidly and the field gave every promise of a heavy yield. Our estimate at the time was 4,500 bushels or better. About September 1 in looking over the field I thought I could detect a faint tinge of brown here and there. I did not go into the field, however, to make a closer examination. On September 4th I came to Indiana and did not see the field again until the 12th. At that date the plants were entirely dead, the leaves and stems having the appearance of being scorched. The field gave a yield of about 2,200 bushels, smooth, but small, while more than 600 bushels of blight-infected tubers were left on the ground.

The treatment for both the early and late blight should be preventative rather than remedial, and consists of applications of the Bordeaux mixture at intervals of about two weeks, beginning when the plants are

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about six inches high and continued until near maturity. While our practice in Michigan was to apply the Bordeaux mixture as a powder, I am satisfied that the liquid form is better.

Potatoes grown for seed should be harvested as soon as well ripened. As a rule they are injured rather than benefited by being left in the ground after maturity. When soil conditions are right, digging should go on rapidly, the tubers handled in bushel crates, and taken at once to the storage cellars. The latter should be darkened but well ventilated and should remain open until the coming of severe weather, which in central Indiana is near the end of December. The tubers, however, should be carefully protected against the cold snaps which are liable to occur at the approach of winter. When the temperature of the cellar has fallen to about 45 degrees it should be carefully closed and care taken to prevent the pocketing of frost in any part of it. A variation of a few degrees will do no harm, but the temperature should not be allowed to go below 40 degrees, as germinal vigor may be impaired.

This paper would hardly be complete without some reference to the principle of selection as a means of seed improvement. Work along this line should appeal to the boy on the farm, and, if taken up in the right spirit, may be a source of profit as well as a pleasure to him. Any variety of potatoes may be selected for the test, preferably, however, a good one, sets from which should be planted in good garden soil and given the best of care.

Selection may be made for many purposes, such as increasing the productiveness, causing a variety to mature earlier or later, making it more resistant to blight, reducing the number or depth of the germs or eyes, improving the quality, changing the form, etc. The end sought usually suggests the means. To illustrate, productiveness is likely to be increased by selecting the best tubers from the most productive hill for the second planting and repeating the process from year to year. Varieties can be made earlier or later by selecting tubers from the hills ripening earliest or latest, respectively. The Late Puritan, one of the best late varieties ever introduced, resulted from the selection of tubers from a single plant in a field of Early Puritans. This plant remained green long after the crop had matured. When dug, the potatoes from this plant were identical in form and color with the early variety, but about three weeks later and immensely more productive. In a five-years' competition test at Ottawa station the Late Puritan ranked second of twelve most productive varieties, with an average yield of 485 bushels.

The mental training which results from doing this work is a valuable training in the elementary principles of horticulture. The boy who would undertake it must recognize the broad, fundamental principle, applicable to

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all living organisms, namely, that like produces like. He must also have some knowledge of the organism to which this principle is to be applied. In the care of the potato, he should know something about the culture, and prevailing types. In order to improve existing varieties he must have a mental picture of a superior type. Then in his effort to realize this type—that is, in the experimental work—he must observe, compare and judge. Such efforts are distinctly educational and of geat practical value to the young experimenter.

In conclusion, I should like to ask potato-growers present what is the status of our little industry anyhow? The corn crop of 1903 in the United States was valued at $952,586,801; that of the potato crop, $151,-636,094. A difference of over $800,000,000 in favor of corn. That makes us look pretty small, doesn't it? The average value of corn per acre in the United States for 1902 was $10.81, and in the States of Indiana, Illinois and Iowa, $13.64, $13.93, and $10.56, respectively. A difference in favor of potatoes in the United States of $34.21 per acre, and in the States of Indiana, Illinois and Iowa of $31.25, $35.63 and $22.76, respectively. This looks better for the potato-grower, doesn't it? Moreover, the potato as a farm staple is just rising above the horizon. King Corn is at its zenith. The latter has nearly reached the limit of extension imposed by nature. The former has no limits; from ocean to ocean, on mountain top and in valley, from the land of the midnight sun to the farthest limits of the Sunny South, the potato thrives.

A word as to its future. Its vast range of climate, great productive possibilities and almost universal use for food, are the potential factors destined, in my opinion, to make the lowly potato the great food staple of the western world.

President Swaim—We will now take up the discussion of this question. Has anyone some remarks to make or some questions to ask along this line?

Mr. Henby—The gentleman did not mention in his paper the size or the grade of the potato. I think that is a very important question. Should we choose the medium or the largest, or should we take the small ones for seed? I do not believe he mentioned that fact in his paper.

Mr. Nysewander—I suppose I must have overlooked that, then. We prefer potatoes ranging from two ounces up. We do not like them too large, for it means that it contains a large number of starch germs, and then again the machine will not handle them so well.

Mr. Kingsbury—I would like to ask this gentleman, whether in his opinion this is a good State for raising the potato? I understand that he was formerly in Michigan.

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Mr. Nysewander—I think that you can raise good potatoes in Indiana. I will say, however, that you must have the soil in good condition. I apply about ten tons of stockyard manure with a spreader and get 200 bushels.

Mr. Kingsbury—On how many acres?

Mr. Nysewander—Per acre. Previous, however, to my crop of potatoes I had raised crimson clover and had turned it under and then I had used fertilizers in different quantities, say from six hundred to a thousand pounds.

Prof. Troop—How do you cut your potatoes?

Mr. Nysewander—By hand.

Prof. Troop—How many bushels did you say you secured from those potatoes?

Mr. Nysewander—The potatoes produced about two hundred bushels or a little over, and not a bushel of undersized potatoes.

Prof. Troop—What variety?

Mr. Nysewander—Early Ohio. I will show you how I cut potatoes. (See cut No. 1.) It is almost impossible to cut one of these potatoes with this knife, they are too large, but I will make an attempt.

Mr. Henby—I would like to know what the ten tons of manure cost you and what the fertilizer cost you, and how many bushels you planted, and how many per acre you got?

Mr. Nysewander—I will answer your question in a few minutes. Mr. Garrison is now going to cut a potato for us. (See cut No. 2.)

Mr. Garrison—I think one eye, if strong, is better than more, and I like to cut them so that the piece extends to the center of the tuber, thus. [Mr. Garrison's cut is not shown exactly in the picture. He cuts a piece circling the eye, cone shaped, apex toward the center.—Secretary.] I have been asked what I mean by a fibre. If you will notice in this potato you will see a little threadlike substance running through the potato. You have seen it, haven't you, Mr. Nysewander?

Mr. Nysewander—Yes, sir.

Mr. Garrison—When Mr. Nysewander was in Michigan I requested him to send me some small potatoes, and when he shipped them to me I took them into the orchard and spread them on the ground, a portion of them in the shade and a portion in the sun, and I let them lay there until they were green and they started a strong stem. I then planted them and I got three hundred bushels to the acre.

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Mr. Nysewander—I have been asked as to the relative suitability of the State of Indiana and the State of Michigan to grow potatoes. While Indiana is not a potato state as compared with Michigan and Wisconsin and Minnesota, yet it is in a way a potato state. The element of climate is somewhat against the potato-grower in Indiana, that is, we may say it is not favorable frequently, but under ordinary seasons and conditions it is possible for the Indiana grower to raise nice potatoes. We recognize, however, that he is working at a disadvantage which he will have to overcome by additional experience and skill. I have seen very fine crops in this state, and we have potato-growers in this state getting very fine results in a large way, and I believe that Indiana will grow more of them and larger and more profitable potatoes with the increasing experience. The soil conditions are more favorable in Michigan for one thing; their soil is more easily kept in condition, but a great deal can be done with Indiana soil and if you once get the soil right you can keep it right with comparative ease. It is a matter of the preparation of the soil.

President Swaim—A gentleman over here asked a question in regard to the cost of the ten tons of manure and the fertilizer.

Mr. Nysewander—It would be rather difficult to itemize the cost. I suppose the cost per acre would be something like fifty or fifty-five dollars. You must remember, however, that you have put the elements in the soil and a large part remains there, and if you practice the system of rotation of crops it will be very beneficial, and so, therefore, we could not afford to charge it all up against the potato. One year with another under a continuous system of crop rotation the cost of these potatoes would not exceed from twenty to twenty-five cents.

Mr. Traub—Do you make a deep or shallow furrow for planting?

Mr. Nysewander—I prefer to plant shallow.

Mr. Garrison—Do you plant on a level?

Mr. Nysewander—I like to plant them slightly below the level, but always cover shallow.

Prof. Troop—Have you tried the mulch method?

Mr. Nysewander—No.

Mr. Kingsbury—You put on ten tons of stockyard manure to the acre, and fifteen dollars' worth of fertilizer, and you calculate that you can raise potatoes for twenty-five cents per bushel.

Mr. Nysewander—In regard to the cost, we figure that the cost is pretty close to fifteen or twenty cents on a patch of two hundred bushels,

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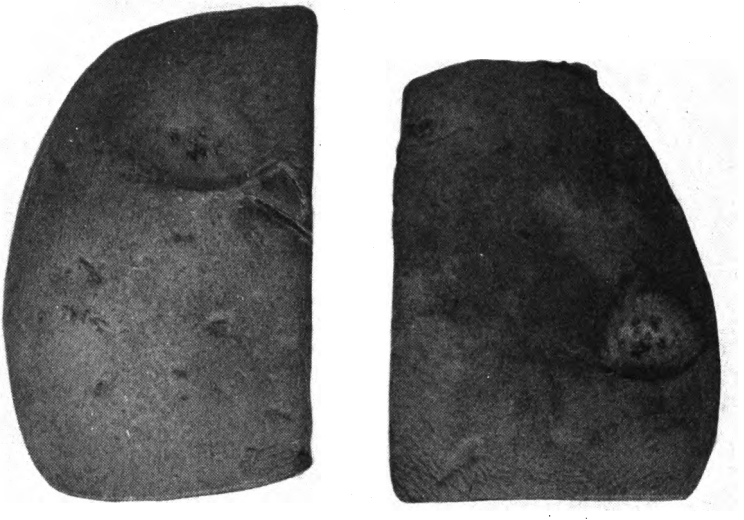

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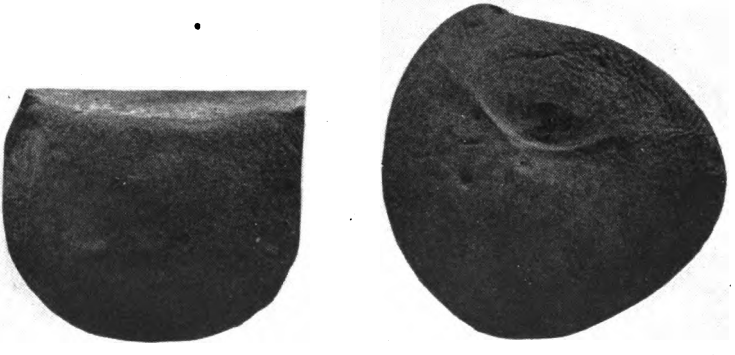

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but it would not cost more than fifteen cents with the modern methods and modern labor-saving machinery on a larger scale.

Mr. Doan—I would like to ask when you consider it best to plant potatoes for early and also for late crops in central Indiana, and what varieties are best?

Mr. Nysewander—Of course that is a question upon which we all differ. I do not pretend any special knowledge on the subject. I think that the Early Ohio is a very satisfactory early variety in this section. It also gives good satisfaction in the north. It is good in almost every way and it does not degenerate, and I will say that it is a very fine representative.

As to the time of planting, I plant in this state as early as I can get them in the ground—in fact, I would lay awake at night planning how I could get them in quicker.

As to the time of planting the late potatoes I think there are others here who could give you more reliable information than myself. I rather favor planting rather early in May, but I see no good reason for that. I believe that if one can take good care of his seed, so that it is not injured, that it is early enough to plant in June, or say the first of July. You want to get the ground in the best possible condition and then handle the seed carefully and get them in the ground with as little injury to them as possible, and then take the best of care of the plant and keep them rid of insect disease and keep them in a thrifty condition until September, and if you can do this you will have a good, big crop of potatoes. The great difficulty is that they are injured in August by the drougth and then they go into September with little or no life, practically in a condition of maturity, and under those conditions the crop is small.

Mr. Henby—What about the Rural New Yorker?

Mr. Nysewander—It still gives good results. Up in Michigan we find it giving splendid results.

Prof. Troop—I will say that last year we planted late potatoes after the strawberries had been picked—if I remember rightly we planted them on the first of July—and when we gathered them in we had two hundred and fifty bushels to the acre.

Now one word in regard to the mulch system. Some of you who were at Purdue this summer saw the couple of rows that we had covered with straw. The seed was placed in the rows the same as in the others, and covered with straw to a depth of eight or ten inches; while in the other row the seed was dropped in the trench and just enough soil put over it to cover the seed and then covered with straw. On the other

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row there was no soil at all. When we came to dig the potatoes those under the straw gave the biggest yield. We had three hundred bushels to the acre in the row that was covered slightly with soil and then with straw and nothing more done during the season except to keep the insects off. The one that had no soil over it at all was a little lower in yield, but these two rows gave the largest yield.

President Swaim—What about the quality of the potatoes?

Prof. Troop—As to the quality we could not see any difference. We tested their cooking qualities with the others and could not see any difference—we thought one was as good as the other. As to their keeping qualities we do not know, but we are testing them now. (See Influence of Soils and Fertilizers on the Quality of Potatoes, p. 102. Secretary.)

Mr. Milhous—How many tons of straw did you use to the acre?

Prof. Troop—We did not figure. We covered the ground about eight or ten inches deep on two rows twenty rods long.

Mr. Wilson—Those of you who have raised strawberries and have covered them over with straw know how much straw it will require to cover a small patch. If we had to buy the straw at present prices we couldn't afford to put it on potatoes even though we raised 200 bushels to the acre. I am sure of that. I cover the trenches slightly and then I get straw manure from the barn and put it over the rows. This keeps the soil moist. I like to cover them with a little soil, for it keeps the mulch from coming in contact with the tuber. I think that the Early Ohio for an early potato is the best we have. For a late potato there is nothing we like better than the Empire State, for that is a grand, good potato. I think it is as good as the Early Ohio for cooking. I never thought that the Rural New Yorker was a good cooker. There are some people that do not know the difference in the eating qualities, but when the Early Ohio comes to the table we all know that it is good.

Mr. Milhous—My experience in covering the ground with straw is that it will take not less than thirty tons of straw to the acre, and that would cost us two hundred and forty dollars, for we cannot get it near Indianapolis for less than eight dollars a ton, and that would make our potatoes rather expensive.

Prof. Troop—I do not wish to go on record as advocating the use of the straw. I simply said what we had done to show what could be done, but if it costs like that for the straw I guess that would be a much too expensive way.

Mr. Snodgrass—I would like to say something if in order. Up in our

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part of the state we have been selling our straw, and since we have done it we have figured out that we would have been better off if we had burned the straw instead of selling it. Now, this is the reason: We sell it, and do not get much for it, and when the buyers come after it they put as much as they can load onto the wagon and go out on the roads and ruin them for us. It costs us more to fix up the roads than the straw brings us. We sell our straw for four cents a bale. The farmers are beginning to see it. Now, if it is true that it is good for use in raising potatoes we would be much better off if we would use it in that way.

Secretary Flick—This paper and the talks on the subject are very valuable, and the society will publish them in the annual report which will be sent out in June or July next, but it has occurred to me that some of you might want to have them before the book is published. I would like to see the hands of the persons present who would like to have a bulletin containing the whole. Thank you. We will have this published and mail it to you.

Prof. Troop—This brings up a question I have been thinking of for some time, and I will move right now that inasmuch as our report is not out until rather late next season, that the papers that are of special merit on any line of work that they be published by the secretary in bulletin form and distributed among the horticulturists. That is one way that we can make good use of some of our surplus money that would otherwise go back to the state.

Mr. Milhous—I second the motion.

Mr. Kingsbury—Do you think we should leave all of the responsibility to the secretary of deciding what should be published. I think that the society ought to instruct the secretary what it desires published and then that will relieve him of that responsibility.

Prof. Troop—It seems to me that the secretary is in a position to know what is desired more than the rest of us, and I for one am willing to leave the whole matter with him.

Joe A. Burton—I do not suppose that these remarks refer to the importance of the papers merely, but only to those that might be used in getting in our crop next year. We might have a very valuable historical paper but we could wait for it until the book is published.

President Swaim—That is the idea.

The question was voted on and carried.

Mr. Flora—I suppose that this bulletin will include the discussions following the paper, which would be quite interesting.

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President Swaim—That was in the motion. I think that we have devoted all the time that we can to this paper, and we will have to pass on to the next topic, which is "Culture of Hotbed Cantaloupes," by Richard Ready, of Decker. I do not believe that Mr. Ready is in the room. Mr. Woodbury, wouldn't you open this discussion for us?

Prof. Troop—I was just going to say that Prof. Woodbury has been doing some work along this line this summer, and that he might give us a talk on this topic at this time.

CULTURE OF HOTBED CANTALOUPES.

BY PROF. C. G. WOODBURY, PURDUE UNIVERSITY, LAFAYETTE, IND.

Prof. Woodbury—I would be very glad to tell the society anything that I can about the melon business in Indiana. I am sorry that Mr. Ready, who was to have discussed this subject, is not here, for he is one of the most successful cantaloupe men in the southern part of the state, and he, and some of the other melon men who have been in that business probably since before I was born, would be better qualified to tell the society about it than I am.

The Experiment Station has been doing some experimental work, however, in melon growing during the past year, and in the progress of that work some interesting facts have come to light and some interesting results have been secured. If there is anything that I can say along this line that will be of any interest to you I will be glad to say it.

The melon growing section of Indiana for the most part is in Vigo, Knox, Gibson, Sullivan and Posey counties. Watermelons are grown in other parts of the state in addition to these places. They are raised over about Seymour, Jackson county, quite extensively. The melon business in this state is growing, but still the people are not living up to their possibilities. There are places where a great deal of money could be made out of this crop where they are not growing melons at this time. Last year, I believe, there were about thirteen thousand acres devoted to watermelons and cantaloupes. There are a great many problems that present themselves to the melon growers upon the successful solution of which the success of their business depends. It was in connection with some of those problems that our work in the melon growing section of the state was started. It may be better to devote more time to the question of the method of growing than to the question of disease.

Now the watermelon business and the cantaloupe business are quite distinct; the watermelon business is carried on in a more general way. Cantaloupe growing is a specialty. A man who grows cantaloupes is a specialist; that is, if he grows them on a large scale.

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The prosperity of the country around Decker depends very largely upon the cantaloupe crop. In good seasons the town is prosperous, and when there comes a bad season they are discouraged. In every direction, for miles around there, if you will drive out, you will see hundreds of acres of cantaloupes growing. This is a rolling, sandy country, and is admirably adapted to the requirements of this crop. A number of the growers have been in the business for many years and some of them are enlarging their plantations every year, growing more cantaloupes.

Cantaloupes are not planted in the field in the beginning, but are planted in hotbeds, and later on they are taken to the fields and transplanted. These hotbeds are usually eight or ten feet wide and from twenty to forty feet long.

Mr. Milhous—Do they put manure in the bottom of these hotbeds?

Prof. Woodbury—I will come to that in a moment. The sash are arranged to slide and in this way they regulate the ventilation over the beds.

Now as to the manure that they use. It is very thoroughly treated before it is allowed to go into the bed, and it is not put in until it is very well rotted, and is then a fine material. They put their seeds in boxes made very much like berry boxes except that instead of the bottoms setting up in they are flush, and are about four and one-half inches square. I do not know the exact size. They are about four inches deep. These boxes are placed side by side over the bottom of the hotbed and then the soil is put in and seeds sown. After this very careful attention is given to the watering and to the thinning, eventually only one plant being left in the box. Of course all the weeds are kept out and surplus plants are transplanted to fill vacancies until finally there is a uniform stand all over the hotbed. While the plants are getting started the fields are being prepared to receive them, and then they are laid off. There are several ways of doing this. One way is to lay the field off into squares of about four and one-half feet and then furrow out one way. Then they take long wagons with boards extending away over the back and drive to the hotbeds. The boxes are then placed on the boards and are hauled off to the field. Sometimes three or four wagons are kept busy, for they have a gang in the field ready to take them and place them in the rows in the intersection of the furrows. They usually keep two or three acres ahead of the planters all the time. Next a gang of small boys come along with knives and slit the corners of these boxes, which are pretty well rotted, so it isn't much trouble to cut them. The plants have been watered just before taking them from the hotbeds and the roots have not been disturbed. When the corners of the boxes have been cut so that the veneer wood falls away, then another gang comes along, places the cube of earth in position and brings the dirt up

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around the sides. They are not shoved down, for this would injure the roots. After this it is a matter of cultivation and fighting troubles until the crop is ready to harvest. The harvesting of the crop is one of the specialties of the business, for it takes quite an expert to tell the right time to begin picking, and there are some men that begin too soon every year, because they are attracted by the high prices that the Decker melons bring and they want to get ahead of the rest of the fellows and they pick before they ought to. The result is that there is a great deal of kicking during the early part of the season caused by some one man trying to make a scoop on the others and get his stuff on the market before the other man and get the high prices. These cantaloupes that are picked too early are lacking in quality and a disappointment to the buyer, but they do bring high prices.

When the melons are harvested they are brought to the packing sheds and carefully sorted and packed. Decker melons are packed in eight-pound baskets and usually in the ordinary season there are sixteen melons in a basket. This season the melons were larger than usual, owing to a great deal of rain, and sometimes other packages were used. These melons are now placed in refrigerator cars, whole trains of which are brought in, and they are shipped to all parts of the country, most of them going to Illinois, Ohio and Pennsylvania points, and some go to the eastern markets. The market is pretty wide.

There are a number of methods of selling. Some fill or load the car and sell it just as it is; some men sell them before they are picked; some sell to commission men. The method of selling on the track is coming to be the most satisfactory. The grower takes the responsibility of the melons until they are on the track and then he sells them for cold cash right there. In this way he is running no chance of the market fluctuation while the melons are on the road from Decker to whatever market they may be going. Many buyers are always present, representing wholesale houses, and the competition among them keeps the prices fair.

Now, if there are any questions which anyone wishes to ask on this part of the subject I will be glad to answer them before I take up the subject of diseases.

Mr. Milhous—Do they pack the dirt into the boxes or leave it loose when the seeds are sown?

Prof. Woodbury—It is made pretty firm in the bottom, but the surface is kept loose.

A Member—How about the blight?

Prof. Woodbury—Now, about diseases of melons. The blight is a very general term, and melon blight means several things. When applied to

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the watermelon it sometimes means one thing and sometimes another, for it is such a general term. Rust is sometimes called blight and is a pretty serious trouble. Some seasons it is much worse than others. This season it was very bad. Rust is caused by a fungus and first appears as small dark brown spots on the leaves. These under favorable conditions, especially in rainy weather, will enlarge very rapidly and the surrounding leaves will be discolored and turn brown and shrivel up. I have seen whole fields of twenty to thirty acres entirely ruined by the rust, and the leaves would fall away so that you could see every melon in the field; the vines would be completely gone. his is the way rust works, and in wet seasons it is worse than in dry ones, and it is also worse in the low parts of the field where the dew settles most at night, and usually that is the first place it will develop. We have tried two or three things in Decker this year to control that, and one was a rust-resistant cantaloupe which was introduced from Colorado from the Rocky Ford country. This proved fairly satisfactory. It was not "rust resistant" but "rust enduring," if you catch the distinction between the two terms. Rust would attack it to a certain extent but it would not spread on this variety as it does on the home grown Decker varieties. The rust would not run together as it does with the Decker varieties. It was of good quality but it grew so large it was awkward to market. It was about twice as large as the Decker melons, and its size made it bad to market, and, therefore, it was not very satisfactory from that standpoint. Then it had another disadvantage; it was about ten days late, and in some cases it would be two weeks later than the Decker melons. This was another serious disadvantage. It was an advantage that it was rust enduring and was, therefore, not affected so seriously, and it may prove to be of value to us yet if we can set forward its time of ripening and reduce its size.

Now, as to spraying the melons. We divided fields into three or four divisions and sprayed one part once, another twice, another three times, and another four times, with Bordeaux mixture, made according to the 5-5-50 formula, and in other places in the field we would give no application at all. Of course there has not been much spraying done down there and we will have to perfect the methods. I will say this, however, in our crops that were sprayed four times, the vines stood up, and I have some photographs which I wish I had here, and if I had known that I was to talk upon this subject I would have brought them along. Where we sprayed three times the results were not quite so good, and where there were only two applications we could only slightly notice the effect, and where it was only sprayed once we could see no results at all. Four applications did not keep the vines entirely free from rust, but it kept them healthy enough so that the crop ripened normally and had fine quality, and

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on account of this we felt encouraged. This work will be continued. The first spraying was done not long after the plants had been set in the field. The second was done when they began to have runners, and then there were a couple of sprayings after that. The time for the last sprayings depends of course upon the season. If the season is wet you will have to keep after them, but in a dry season you will not have to spray so many times. In some seasons it might be advisable to spray five times.

We can not draw absolute conclusions from the one season's work.

There is another thing which we have to contend with that presents a more serious problem, and that is the wilt. There are two kinds of wilt, one works on the watermelon and the other on the cantaloupe. The one that works on the watermelon is a disease that lives in the ground from year to year, and this season we studied the history of about one hundred affected fields. We know about these fields for years back in every case. We found out when the wilt first appeared in the fields and upon comparing the records it seemed pretty clear that after this wilt had once appeared in a field that if that field had been kept out of watermelons for four or five years the wilt would die out so that the field could be safely replanted. If a field which had once been infected had been out of watermelons only a year or two, the disease would reappear if melons were put in again. If there were a number of years intervening between the crops of watermelons the fields were safe this year. I remembr a particularly striking illustration in one field of about twenty acres. Ten acres of the field had been out of watermelons for two years, and the rest had been out of melons for six or seven years. This part had had the wilt the last time the field was in melons. That part of the field which had been out of melons for only two years had the wilt badly, and that part which had been out for seven or eight years did not have it at all. This seems to indicate that we should fight the wilt by a long rotation of crops.

Now, with the wilt on the cantaloupe we have a harder proposition. That is a different disease and will affect the crop on land that has not previously been in melons at all. This cantaloupe wilt is a bacterial disease, and there is not as much understood about it as we wish there were. We are not ready at the present time to make a definite recommendation as to how to control the wilt that works on the cantaloupe. Weather does not seem to have much to to do with it, and spraying seems to have no effect whatever, so we are not yet ready to say a final word.

Mr. Henby—What is it that attacks the cucumber?

Prof. Woodbury—I was called to the northern part of the state once during the summer and I spent a day or two there looking over a number of cucumber fields. These were fields which were planted for Mr. Heinz

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to be used in making some of the "fifty-seven varieties," and I found the same trouble there as is on the cantaloupe fields in the southern part of the state.

Mr. List—From an experience of twenty years I think that this is a disease of the roots of the plants, and I do not think that spraying will help it at all. You will find by close examination that the disease is on the roots, and this interferes with the feeding and the vines wilt and die. It seems that it plugs up the water ducts, thereby cutting off the circulation. If you will make a cross section of the stem when this disease shows itself you can see just what I mean.

Mr. Garrison—Is there any certain time in the year to begin or does it begin any time?

Prof. Woodbury—I have seen it delayed until the melons were nearly ripe.

Mr. Garrison—Do the plants that are raised in the hotbeds show a tendency for this?

Prof. Woodbury—Not so far as wilt is concerned.

Mr. Garrison—If they have a two or three weeks' start does that have any advantage?

Prof. Woodbury—That has an important bearing on the resistance of the plant to various diseases. A plant that has a good start is not so likely to be killed by the louse or rust.

Mr. Cox—I have been bothered with little bugs. I watch the plants carefully and they will be all right, and the next morning there will not be a leaf left. What will you do with that?

Prof. Woodbury—I am afraid I do not know as much about that question as I did a few years ago. The remedy that has been recommended for years has been liming. In the watermelon district in southern Indiana these bugs were worse this season than they have ever been known to be before. They usually attack only the young plants, but this year some plants had runners on two feet long, yet they attacked them, and in some places they were so thick that any known remedy seemed useless. One man devised a scheme and worked with it this year. I do not know how effective or how practical it will be, but we are going to try it next year. We are going to protect the plants with wire cones. They will cost us about two cents apiece, and we are going to try them next season, and see whether or not we can control the melon bug.

Mr. Troth—In one section of Knox county they rid themselves of these bugs by driving them away, driving them right out of the field. Of course

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if the man who lives next to them had a patch of melons it would be rather tough on him. I know that this is practiced in Knox county.

Mr. Cox—I have tried that scheme, and it never was a success, for they would get back into my patch in spite of me.

Mr. Garrison—I will tell you my remedy for these bugs. I plant squashes all along at different intervals and these bugs will go right for the squash vines. I have had very good success in planting squashes and thus saving my melon patch.

Prof. Woodbury—I have seen the method tried of driving the bugs out of the field down at Oaktown, and it does not appeal to me very much, for the bugs would get behind you as well as in front of you, if they were as plentful as they were this year.

Mr. Milhous—If I never had anything worse to deal with than to stop those bugs I would be happy. I am surprised that some of you are bothered so much with them. Go to the store and buy some pulverized tobacco, perfectly fine, and then get some coal ashes, and mix four pounds of the tobacco with twenty-five pounds of the ashes, sifted, and go over the vines with this and sprinkle them just a little. I use a paint bucket and attaching a handle to it any length you desire, and then take a nail and put some holes in the other end of the bucket and you are ready for business. If you will use this every bug will leave, not one of them will stay. I wish that you would give me all of the money you are going to use on your traps.

Mr. Cox—I have used tobacco in every way. I have even soaked the leaves in water and put that on the plants and I have always been bothered with those bugs.

Prof. Woodbury—The size of the patch seems to make a difference, and when you take a patch of five or six acres like Mr. Milhous had last year it is a different proposition to having seventy or eighty acres of your own and your neighbors having a similar amount. These large plantations are breeding places for a large number of bugs, and as I have said before, it makes a difference in fighting them.

There was one thing which I neglected to state when I was talking of the cantaloupes, and that is in regard to the profits in the business this year with most of the melon men. A number of the men around Decker made two hundred dollars an acre off of their melons, and they did not have three or four acres, but they had from thirty to seventy or eighty acres.

There is a good chance for the further development of the business. There is no reason why the Decker melon should not bring just as good a

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price as the Rocky Ford melon, and it should have as good a name, for I am convinced that they can produce just as good quality, and the only reason is because they use less care in packing in Indiana than they use at Rocky Ford; however, the Decker people are on the right road for they are organizing and going after business in a way that I believe will make them a reputation, and that is what they need.

Sylvester Johnson—What kind of soil in the Decker melon region?

Prof. Woodbury—Sandy.

Mr. Henby—What kind of seed do they use?

Prof. Woodbury—Well, they were originally the Rocky Ford. The rust-resisting sort is promising, and though I do not know of their being marketed at the present time, I think that before long the seed will be for sale. If any of you are interested I would be glad to see you personally and talk more about this.

Mr. Kingsbury—Could they be grown successfully on such soil as this (a cold clay soil)?

Prof. Woodbury—I think they could with proper management.

Mr. Milhous—We raise the Tip Top in Marion county.

Mr. Nysewander—I would like to ask Mr. Milhous how many melons he harvests after the vines have been destroyed by rust.

Mr. Milhous—We harvested melons this year until October.

Mr. Nysewander—How long had the vines been dead?

Mr. Milhous—I never aim to sell melons off dead vines.

Mr. Nysewander—The rust strikes the vines often just about the time the earliest melons are ripening, but I have noticed that the harvesting goes on just the same as long as there are melons. I have seen this practice.

Prof. Woodbury—That is a practice that is followed to some extent at Decker, and every other melon district that I know of. The first melons bring a high quality because the vines are in healthy condition, but after the rust comes the melons have to be picked in order to keep them from rotting, then the melons come from a diseased vine and when they are marketed the people are dissatisfied with them because they do not have the quality. It will be a great help if we can keep the vines healthy by spraying until all the melons are ripened and harvested.

Mr. List—I have never found in my twenty years of experience that the second crop of melons was ever satisfactory. You might find one once

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in awhile, but for all of the satisfaction the community gets out of it you might just as well not try to raise the second crop.

There is one way of telling when a melon is good, and that is this: there will be a little bit of wax run off of the end of the stem if it is good. If the wax is not there the melon will not have the right flavor. These melons will sell as first-class melons.

There is another thing I wish to say and that is that we should be very careful not to disturb the vines when there is the least bit of dew or dampness on them. I have seen the rust started and ruin the patch of five acres in three days by some one going into it in the morning when the dew was on. This will start it nine times out of ten.

Prof. Woodbury—If the vines die five, six or seven days before the melons are ripe they will not have the right flavor. Perhaps I did not make myself understood in regard to the second crop of melons. Some of them will get ripe a week or ten days or two weeks before others are ready to be picked. These that are not quite ripe are what I meant by the second crop. I mean the second picking.

Vice-President Reed—Something has been said about the income from watermelons. I would like to give some idea of the possibilities in watermelons if they are properly cared for. Mr. Wall, of Decker, Indiana, sold his watermelons off of eight acres for fifteen hundred dollars, and they did the picking and hauling to the cars. The first two cars the dealer sold for three hundred and fifty dollars, I believe it was. I heard one of the buyers refuse a spot cash offer of three hundred dollars. In the first car they averaged forty pounds each, and off of that eight acres they loaded something like fifteen cars, and that would make the income double what the land is worth.

Sylvester Johnson—What variety were these melons?

Prof. Woodbury—Kolb Gem.

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FOURTH SESSION, THURSDAY, 1:30 P. M.

President Swaim—Before any other work this afternoon we will have the reports of some of the committees. We will have, first, the report of the Auditing Committee.

Secretary Flick—I have the following report from the Auditing Committee:

To the Indiana State Horticultural Society:

We, the Auditing Committee of this society, have examined the accounts of the secretary and treasurer as submitted to us and find them correct.

This committee respectfully suggests and recommends that duplicate vouchers be made of all expenses, one for the use of the Finance Committee and one for the auditor of state.

L. B. CUS ER,
J. M. SNODGRASS,
R. A. TROTH

Sylvester Johnson—I move the adoption of the report.

Mr. Milhous—I second the motion.

The motion was voted on and carried.

President Swaim—We will now have the report of the Committee on Awards.

Secretary Flick—Mr. Chairman, the Committee on Awards has made the following report:

[Report was carried away by some one and can not be found. Below are names of some of the exhibitors and amounts received for premiums by each.—Secretary.]

FRUIT PREMIUMS.

Among the largest exhibitors and premiums taken by them at the State Horticultural Society's annual meeting were: J. M. Beaver, Glenwood, who took $35.75 in premiums; J. M. Zion, of Clark's Hill, with 72 varieties, $32.75; Reed & Fielding, Glenwood, $16.75; Chris King, Rushville, $17; Beck & Lair, Connersville, $12; Frank Moffit, Carmel, $11.75; Mr. and Mrs. W. B. Flick, Lawrence, $10.50; J. F. Coffin, Greenfield, $6.25; Chas. W. Lindley, Salem, $5.

The display of fruit was highly creditable, considering the unfavorable season, and proved conclusively that Indiana can grow her own fruit if she tries.—Indiana Farmer.

President Swaim—We will now have a report from the Committee on Nomenclature.

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Mr. Hobbs—As chairman of that committee I wish to state that we have gone over all of the apples here and have found a vast improvement in their classification. We found very few errors. I think that is all that is necessary to report.

President Swaim—We will now have the report of the Committee on President's Address.

Mr. Milhous—Your committee on the President's Address recommends that the acting president and secretary be appointed a committee to co-operate with the representatives of neighboring State Horticultural Societies in securing dates for the annual meeting of said societies that will not conflict with each other.

We further recommend that the orchard demonstration work begun by this society be continued whenever our finances will allow.

C. M. HOBBS,
J. J. MILHOUS,
W. H. RAGAN.

Sylvester Johnson—I move that we concur in the report.

Mr. Custer—I second the motion.

The motion was voted on and carried.

President Swaim—I believe that we are now ready to proceed with the election of officers. If there are no objections we will proceed. The first to be elected is the president. Now, before proceeding with this, I wish to say that I appreciate very highly the honor that this society has conferred upon me by making me its president for two consecutive terms, and there will always be a warm spot in my heart for you on that account. My heart and my best wishes will always be with the Indiana Horticultural Society, but circumstances are such that I must decline serving another term as president. We will now hear nominations for president.

Mr. Shoemaker—I would like to place in nomination Mr. W. C. Reed.

President Swaim—I wish to say that we will bar nominating speeches further than giving the name.

Mr. Milhous—I move that the nominations be closed.

President Swaim—If there are no more to offer I declare the nominations closed.

Mr. Ragan—I move that the secretary of this society be authorized to cast the entire ballot of this society for W. C. Reed for president of the Indiana Horticultural Society.

The motion was voted on and carried.

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Secretary Flick—I cast the entire vote of the members of this society for W. C. Reed for president for the ensuing year.

President Swaim—I therefore declare W. C. Reed duly elected president of this society for the ensuing year. We will not give Mr. Reed a chance to make any speech just now, but we will give him a year's time for that. The next thing in order will be the election of a vice-president.

Mr. E. Y. Teas—I wish to nominate L. B. Custer for first vice-president.

President Swaim—If there are no other nominations I declare the nominations closed. The only nominee is Mr. Custer.

Prof. Woodbury—I move that the nominations be closed and that the secretary be instructed to cast the vote of this society for Mr. Custer for vice-president.

Voted on and carried. The secretary cast the ballot and President Swaim declared L. B. Custer elected as vice-president for the ensuing year.

In like manner Sam'l A. Hazelett was elected treasurer; W. B. Flick, secretary; E. T. Teas, member of the Executive Committee; and as members of the Committee on Hortculture:

First District—W. J. Ritterskamp, Princeton.
Second District—R. A. Simpson, Vincennes.
Third District—Chas. N. Lindley, Salem.
Fourth District—Elmer G. Tufts, Aurora.
Fifth District—James W. Carver, Greencastle.
Sixth District—John F. Coffin, Greenfield.
Seventh District—J. J. Milhous, Valley Mills.
Eighth District—A. W. Shoemaker, Daleville.
Ninth District—J. M. Snodgrass, Kirklin.
Tenth District—H. W. Henry, Laporte.
Eleventh District—E. R. Gustin, Peru.
Twelfth District—J. C. Gossman, Lagrange.
Thirteenth District—F. A. Forbes, Plymouth.

President Swaim—I therefore declare these men duly elected. I believe that this completes the election of officers. Now, we will take up the regular work. The first thing on our programme is a paper by Mr. Ragan, entitled "Concerning Indianapolis in 1843."

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CONCERNING INDIANAPOLIS IN 1843.

BY HON. W. H. RAGAN, SPECIAL POMOLOGIST, DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

Mr. Ragan—I have recently had copied, from Hovey's Magazine of Horticulture, of Boston, Massachusetts, for March, 1843, the following very interesting letter of the late Rev. H. W. Beecher, concerning conditions then existing in Indianapolis, and elsewhere within the state. I think the members of the Indiana Horticultural Society will feel greatly interested in its republication in the society's transactions, and for this reason it is herewith presented to the society by one of its early and fast friends.

"AN ORIGINAL COMMUNICATION."

Remarks upon the state of horticulture in Indiana, the favorableness of its climate for fruits, the production of seedling apples, etc., by the Rev. H. W. Beecher, Indianapolis, Indiana.

The arrival of the January number of your magazine has moved me to begin a letter, projected months ago, but hindered by numerous professional engagements. Indeed, I began a letter, giving you an account of our October fair, which I have burned. So I will begin, as far back as last summer, and give a brief view of horticultural operations in this state. Our condition may interest you less and the extent of our operations—than by their progress in so new a state. In this town, the capital of the state, the stumps of the original forests yet remain in many streets. I aided in digging one out of the very center of the town, close by our church, last summer, and stumps with us have no such immortality as belong to your pine stumps, but decay in a few years. Our citizens are not wealthy, and still less are they men of leisure. All that is done among us is done, not by wealth—or as remedy for ennui—but by busy, thriving, hard-working men, who love horticulture.

In this state we have an area a little more than four times greater than Massachusetts. There are eighteen nurseries, whose proprietors are chiefly supported by their sales. Apple trees sell for ten, and pear for twenty cents. An orchard is to be found upon almost every farm, and lately the pear has been more than ever sought after. At our October fair was exhibited the greatest variety of fruits and flowers ever exhibited in this state; perhaps, I may say, in the west. From fifty-five to sixty varieties of apples were shown—and forty-three new seedling apples competed for a premium. A branch of the R. I. Greening was exhibited, two feet in length, bearing fifteen apples, weighing 12 lbs. 9 oz. I send you a brief account of the fair, enclosed in some other papers. You will also see a beet mentioned, weighing thirty-two pounds. You will also see three seedling apples named, and recommended for cultivation—Tariff, Red Jacket and Osceola—the first two capital fall apples, the last

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supposed to be a first-rate winter apple. Those which we have are not yet ripe (January 24), nor at all fit for eating. The number of seedling apples in this state is very great, and some of them, in the neighborhood in which they grow, are esteemed more highly by the settlers than the old standard fruits. The soil and climate so modify the flavor and other qualities of the apple that there is some reason for believing that an apple originated on any given soil will be better than many which are introduced into it; for though the apple is raised with great facility in almost every soil, yet it is probable that each variety affects a particular one, and will refuse its most perfect qualities to all except that one. Thus I perceive the most popular apples of New England are natives —the R. I. Greening, Hubbardston Nonsuch, Roxbury Russett, Baldwin, Minister, etc. The choice apples of the middle states are natives of them, and to a very considerable extent this is becoming true of the west.

The annual meeting of our society is held during the winter, that the great number of citizens from abroad during the sessions of our courts and legislature may be reached and interested in this subject. I shall send you the reports, addresses and proceedings of our winter meeting as soon as they are published. I omitted to mention that, on selling the fruit last October, great competition arose for the pears, and they sold at twelve and one-half, twenty-five and fifty cents apiece, many of them. I obtained the only specimen of the Duchesse d'Angouleme (the first, I believe, which has ripened in the state) for the moderate price of sixty-two and one-half cents. I am afraid I should have doubled the bid rather than lost her ladyship; and if all duchesses are of equal worth, commend me to their society. I need not say that I was "somewhat filled" with her company. It was not a dear bargain in the sequel, for the gentleman who raised it was so much pleased with my enthusiasm for his favorite that he presented me a tree of the same kind, and one of the Beurre d'Aremberg.

You will perceive, when you obtain the report of our winter meeting, that a premium of fifty dollars is offered for seedling apples. Other premiums to encourage gardens, the obtaining of choice fruit trees, introduction of hardy shrubs and flowers, etc. Our great design is to awaken in the body of the people, among the farmers, artisans and men of small means, a taste for fruit and flowers, and to fill the state from the beginning with the most select varieties. The peach, plum, cherry, apple, pear, quince, apricot and small fruits might search through our land and find no better soil and climate for their perfection than that of Indiana. Our variable springs are almost the only obstacle. Long summers, brilliantly clear atmosphere, great warmth, and dryness during the fall ripening months, give our fruit great size, color and flavor. If the mass of the community take hold earnestly, amateur cultivators will spring up

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of themselves. As it is, I remember very few gardens in Massachusetts, except near large cities, which could compare with ten or twenty in this town. (Indianapolis is a town of about the size of Northampton.)

In going to Terre Haute last summer I stopped at a small, poverty-stricken little town called Mt. Meridian; shackly houses, huts and hovels, pale faces, ragged children—gave no great expectation of refinements. Putting up at the best tavern (at the west, no matter how small the town, there are always from two to five, or even eight taverns to choose among). I soon retired to bed, as the easiest way of reaching the next morning. On rising and going into the rear of the building for washing water (we are always allowed to help ourselves in such trifles), I found the well standing in the middle of a very beautiful little flower garden! neat beds, full of flowers, clean walks, trimmed borders. I could hardly trust my eyes! From the rear of the grounds I could almost throw a stone into the primeval forests, whose fragments yet lingered in parts of the garden; and the house was itself poorer than many a barn which I have seen in Pennsylvania and Massachusetts. Opening a rude wicket gate I entered a spot of nearly an acre, well laid out and filled with the choicest vegetables, growing with the most vigorous health. Currants, raspberries (white and red Antwerp), strawberries, gooseberries, were thriving—and many select varieties of pear and apple. The whole garden bore evidence of careful cultivation and good taste. Such a spot, in such a town, and behind such a house, surrounded, and almost overshadowed by the forest, and produced not by wealth, but by the personal labor of one man—poor, advanced in life, delighted me more, I do believe, than would the grounds of the London Horticultural Society. If every county in our state had one such citizen I should not fear for horticultural interests in our state. The best assortment of seeds and plants which our town will afford shall be at the service of such a cultivator the coming spring.

We know of no way of circulating your excellent magazine so feasible as offering it as a premium, and you will see that we have done so in several instances.

You will be pleased to learn that many of the pears which have given out in New England do well as yet with us. The St. Michael (or fall butter, as it is called here) thrives and bears excellently well, though Kenrick, following Fessenden, says that in New England it is "an outcast, intolerable even to the sight." The specimens at our fall fair could hardly be surpassed.

A number of public-spirited gentlemen have associated to plant all the private streets in this town with shade trees. We shall select from the ample stock of our own forests mostly. But it is proposed to put in a number of pear and plum trees—the first being a beautifully shaped tree

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as well as fruitful, and the plum, it is thought, will be free from the curculio, planted upon a highway. In the three squares upon which stand the state house, court house, and governor's house, it is proposed to gather and plant a specimen of all our forest trees.

This reminds me of an incident in our early town history related to me by one of the first settlers. A large circle of nearly four acres was reserved in the center of the town, and the native trees, sugar maples, left standing upon it. Under these trees, before churches were built, religious meetings were held in summer, and the prospect was that our town would have an adornment of this little grove, which no architecture can bestow. One morning, however, he was attracted thither by the sound of an ax, and found one of the leading lawyers in the place, exercising himself, as a preparation for breakfast, in felling one of the largest trees. It was too far cut to be saved. And so good an example could not be lost upon others. One by one, these magnificent trees disappeared. Now, we have a huge yellow brick building in the center of this circle; about a dozen locusts, with stems half as large as one's wrist, have for the last three years been struggling for life, until they seem weary and faint, and so stand still.

The Court House Square, something larger than the former piece of ground, was covered with a noble growth of stately trees, and it was determined to save them. A man was set, however, to thin out the plat, and being left to his own descretion, he felled all the younger trees, and left the very old and tall ones standing. As might have been expected, the first wind, finding an easy passage through, uprooted a multitude of trees; and the citizens, to save the rest from a like fate, chopped them down instantly, and happily relieved this square, too, from unpleasant shade. All is not yet told. At a later day a number of gentlemen procured an order (if I mistake not) from the county commissioners to plant out the ground with shade trees, and a large number of locust were set. However, that nothing might break in upon the practice of the county, the jailer's cow was permitted to pasture upon the plat, and in the sight of the citizens, she proceeded patiently to bark the trees, or to break them down, until not a single one was left. A gentleman, not without a taste for horticulture, from day to day, saw, from his office door, this destruction, as he informed me with great naivete, as though it were a sin to interfere and save the trees. Thus, in all our towns, comes first extermination; then come scorching summer suns; and, too late, the wish that the trees had been spared; and at last planting begins; and we who live amid the immense forests of a new country, on whose town plat, not fifteen years ago, grew immense oaks, maples, sycamores, beeches, tulip trees and elms, are planting the short-lived locust (Robinia pseud-

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acacia) to obtain a speedy shade! I can think of but three forest trees now standing in this town within a space of one mile square—two elms and one buckeye. The same scenes are enacting in every town which springs up in the west. We are gaining meadows and corn bottoms and green hill sides, and town plats, by an utter extermination of the forest. Here and there an Indian may be found lingering around the old possessions of his nation, as if to mourn their loss and to remind us of his ancestors; but of the forest, it is almost true that not a single tree is left to recall to our minds the glory of its fellows. Indeed, I have thought that those who were obliged to clear farms, or timber land, imbibe the same feelings toward the trees which the pioneers have toward the Indians—as things to be destroyed, of course. This devastation of our forests, the political economist regards as a blunder, and says it is an unthrifty practice, but one who looks upon trees almost as if they had souls, witnesses this needless extermination with some feelings which cannot be expressed in the pound and penny language of the mere economist. I think it is Michaux who pronounces the full-grown elm to be the most magnificent production of the vegetable kingdom. Is not an old, and tall, and broad and healthy tree nobler to the eye than any temple or cathedral? The wonder of a century's growth ends in an hour by some man who never for a single moment thinks of the majesty or beauty of his victim, who only thinks how soonest to get it down, and burned up, and out of the way of the plough. Respectfully yours.

H. W. BEECHER.

Indianapolis, Indiana, January, 1843."

President Swaim—I think this paper is well worth a place in our next annual, and we will certainly appreciate having this bit of history.

Mr. Joe A. Burton will now tell us something of the "Lessons of the Past Season."

Joe A. Burton—

LESSONS OF THE PAST SEASON.

BY JOE A. BURTON.

The past peculiar season has plainly brought out some facts. One is the importance of late blooming. Genets had no trouble setting a full crop; so also Ingram and a late blooming sweet. Rome Beauty bloomed late enough to escape some of the injury. Ben Davis went down all over the country, a victim to his habit of early rising. All early bloomers suffered severely in this respect. We would not recommend to abandon a variety just because it blooms early, but, other things being equal, we would prefer the late bloomer.

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Another lesson that has been very, very strongly brought home to us is the importance of saving all the fruit possible in an off year. They are so high priced that we could afford to spend a whole day to save one bushel. Our Ben Davis set so few that we did not spray them. They did set enough to have made from two to five bushels per tree. These would have been worth from $3 to $7 per tree, and on the seventy trees from $200 to $500. One day's work for two men and a team at $6, and $8 for spray material would have saved them. As we managed them we got nothing. We not only failed to get this that the Good Man offered us, but we let the Devil get it and raise a big nest of worms in each apple. Here was the greatest source of the second brood of coddling moth that damaged our crop over $1,200.

Our next lesson is very plain, viz.: Not to allow any apples to grow on our place that are not sprayed. If they are not worth spraying, cut them down. But how about our neighbor's trees that are not sprayed? The codling moth has no respect for a wire fence. His neglected trees bear but few apples to maturity and so will live longer than ours. The codling moth does not injure the tree. Well, when the San Jose scale comes he will have to spray or get out of business. "It is a poor wind that blows nowhere." If the law compels him to spray for the scale, and thus prolong the life of his trees, he will soon tire of it unless he sprays for the codling moth, and to get rid of the trouble will cut his trees down.

Then, this lesson becomes evident: All our legislation about the San Jose scale and an entomologist is unnecessary. All competent authority on the subject tells us the scale is sure to come; that it can be held in check by proper attention; that unprotected trees will be killed in a few years; that it will require extra effort on the part of successful growers, but they will be rid of the annual crop of moths from the nuprotected orchards.

Another lesson is the importance of spraying as soon as the blossoms fall. Our trees kept up the blooming for over six weeks. We hardly knew when they were done blooming. The weather was very cold and rainy and we did not hurry out to spray. Thought apples would not grow during such weather, but the early varieties had grown and the calyx generally closed before we sprayed. So, our early apples were just about as wormy as those we did not spray at all. Our spraying came inside the ten days recommended by the authorities for the second after the bloom falls. We concluded that a second spraying in ten days after the first is not effective against codling moth.

Another lesson taught is that we do not know by what means the pollen is conveyed to the pistils. It is generally claimed that the bees are

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the chief agents in this work. This season was the worst for bees to fly during blooming season I ever saw, cold and rainy. I watched close for the bees but could not see them. The setting of the fruit was the best I ever saw for the amount of bloom. I refer to the bloom left alive after the killing freezes in April.

President Swaim—We have a little time if any one wishes to ask any questions.

Mr. Ratliff—I would like to ask you how you think we should go about fighting the scale?

Mr. Burton—Well, it is an ill wind that blows no one any good, and in everything there is something that finally works out for good, and while we don't want the San Jose scale we understand that it is coming, and if we keep it down it will require some work. It is not very encouraging for a man to spray to kill the moth and have his neighbor let it go, and then have a brood come over to his orchard from his neighbor's. We can get rid of the first brood if we will spray for it. If they let this San Jose scale continue in three or four years the orchard will be dead and gone and then you will be rid of your troubles. When these men have to spray for the codling moth and hold the scale in check or cut their orchards down they will begin to do something. That is the idea that I was getting at.

Secretary Flick—I know enough of Mr. Burton's thorough work in spraying to know that in the last few years he has destroyed nearly every one of the first brood of codling moth, but like a number of other fruit growers, he has not within the last two years. I think the reason of this is that the springs are late and cold and the first brood does not come out until late, and, in the meantime, heavy rains wash away the poison and prevent it from having the desired effect. The second spraying, for this reason, has not the usual effect on the codling moth. Last year I sprayed the first and second time with Bordeaux mixture and paris green and then later with arsenate of lead and water, and I reduced the brood of moths to a minimum. Some poison that will adhere well is the most effective in these backward springs, as arsenate of lead.

Mr. Burton—That will help some.

Secretary Flick—I think that is the best way. My usual plan is to apply the spray three times. First time, just before the bloom opens; second time, just as it falls; the third, about ten days or two weeks later. Very thorough each time, and dripping wet first and second times.

Prof. Woodbury—I would like to say that it is not so much how many scales the Experiment Station kills themselves, as the number of people

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whom they teach to kill the scales. We must teach the people in order to do effective work. The good book says that we must preach to all the world, and that is true, certainly, with us.

Mr. Devore—The scale may work for us in another way. A good observer will agree with me, I believe, that only one tree out of ten planted in the state produces ninety-nine per cent. of the commercial fruit. In other words, only one tree out of every ten pays for its expense; the nine are so neglected, not cultivated and not sprayed, that it leaves the one only as successful. This will lead to compulsive spraying. There is no more use for a man to do his own spraying today than there is for a man to do his own threshing, and I think that in the near future the spraying must be done by companies or large corporations, or the individual who will apply his time to it. He will then have the combination of machinery necessary to do good work. We will soon have to cut the trees down or yield to the inevitable—spraying. Some people do not like to spray on account of poisoning the bees. You cannot wait for the bees. I do not believe that bees are essential to the success of apple growing.

President Swaim—We would like to prolong this discussion, but the afternoons are short, and there is a good deal to be done before we adjourn. We will now have a report from the Committee on Resolutions. Prof. Woodbury.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

Whereas, The State of Indiana has at present no uniformity in its system of measures used for the purpose of buying and selling fruit and other commodities, and

Whereas, It is the belief of the members of the society that great good would result, both to the buyer and to the seller, from such uniformity; therefore, be it

Resolved, That it is the sense of the Indiana Horticultural Society that the state should adopt a uniform package law at the earliest possible moment, and in order that the matter may be brought to the attention of the next General Assembly, be it further

Resolved, That a committee of three be appointed to take the matter under consideration and report at the next annual meeting of the society.

Resolved, That it is the sense of this society that an official score card should be adopted by the society, to be used by judges in awarding premiums on fruit and vegetables at all meetings of the society where competitive exhibits are made, and that the same should be recommended for use at the state and other fairs.

Whereas, It is the belief of the society that much good can be accom-

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plished in an educational way by means of a fruit exhibit at the Farmers' Short Course at Purdue University, and that the work of the society can be brought forcibly before the people of the state and effectively called to their attention in this way; therefore, be it

Resolved, That the president and secretary be instructed to act as a committee for the society, in co-operation with the horticultural department of Purdue, to take charge of said exhibit, make awards, etc., as at the winter meeting, and that the secretary be further instructed to further the work of the society at this meeting in every way possible, receive membership fees, etc.

C. G. WOODBURY,
E. R. GUSTIN,
MRS. A. H. BOGUE.

Prof. Troop—I move that we adopt the resolution as read.

L. B. Custer—I second the motion.

The motion was voted on and carried.

Prof. Woodbury—There is one thing in my mind which I should have attended to before. A few days ago I was at Battle Creek attending the meetings of the Michigan State Horticultural Society. My home was formerly in Michigan. I was especially instructed and commissioned by that society to bring the highest greetings of the Michigan State Horticultural Society to the Indiana Horticultural Society, and to give you their best wishes in every way. I now take pleasure in doing this, but I should have done it before.

President Swaim—I wish to thank the Michigan Society through Prof. Woodbury for the kind expression of good will, and I hope that the movement on foot to form a closer union between the societies of the four states will not miscarry and that we will have the matter in working order in another year. There is one little matter that I have left over, and that is the appointment of a member of the Legislatice Committee for the ensuing year. I will appoint L. B. Custer to serve for three years.

Secretary Flick—Owing to the new ruling of the auditor of state, you will not receive the money for your warrants today, but this will have to be done by correspondence. You should, however, file a bill of expenses in the office. We must have it on file so that we may bring it up before the board immediately after this society adjourns. We get the money upon filing a receipted bill with the auditor. You will find blanks in the other room.

I would like to announce, also, that the society proposes to make awards at the horticultural school at Purdue, and we hope that the fruit

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growers of the state will make a good showing. Those who have fruit to send and cannot be there can send it a day or two beforehand, in care of Mr. Woodbury, and it will be entered and you will receive the same awards as though you were there; but, of course, we would like for you to be there.

President Swaim—I want to say a word in regard to what Mr. Flick has said; that is, to urge all of you who have fruit to send something for this exhibit at Purdue. We are making a start there; it is our first year and it is rather a bad year for us to get fruit, for it is not plentiful, and I would like to urge upon all of you to come forward and make as favorable a showing as we can. Is there anything further? Immediately after adjournment here the State Board will meet at the secretary's desk. I believe that it would be very appropriate to have a few words from our president-elect before we adjourn finally.

W. C. Reed—I desire very much to thank you for the honor conferred on me, and I would like to make a few remarks in regard to fruit. I attended my first meeting of this society twenty years ago this month, and I became a member of this society in August, 1888, twenty years, almost, and in looking over the faces of the members then and now, I see a great many changes. So many of the members in the society are old men. Why is that? Why is it that more young men do not belong to the society? Why don't they come out and take hold of the work? It will not be many years until these gray-haired men are gone, and we must have young men to take up the work when they have quit. And now allow me to urge upon you that during the coming year you endeavor to get as many young men in this association as you can. I think that when I placed my membership with this society I was the youngest member.

I desire the hearty co-operation and support of every member of the society during the coming year, and also of the Experimental Station, and I assure you that I will do all in my power to further the interests of the society for the good of the general public. Of course we are all liable to make mistakes and I suppose that I will make my share of them, but if I do, I hope you will come to me as a friend and tell me of them, and I will try to overcome them, for I assure you I will do the best I can.

(Applause.)

President Swaim—If there is nothing further to come before us, we will consider ourselves adjourned.

The meeting then stood adjourned.

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Proceedings

OF THE

STATE BOARD OF HORTICULTURE

FOR THE YEAR 1907.

Lafayette, Ind., August 8, 1907.

The Board met after the adjournment of the midsummer meeting of the society.

The following bills were filed, examined and allowed:

J. C. Grossman, expenses, Committee on Horticulture	$8 73
Elmer G. Tufts, expenses, Committee on Horticulture	8 40
E. Y. Teas, expenses, member Executive Committee	8 70
Walter S. Ratliff, expenses, member Executive Committee	6 15
W. B. Flick, office expenses	53 67
Sentinel Printing Co., printing, stationery and office supplies	157 90
G. C. Dickson, expenses, attending Lafayette meeting	5 25
W. B. Flick, expenses, attending Lafayette meeting	5 50
C. M. Hobbs, expenses on advisory board experiment orchard and on Legislative Committee	19 00
Chas. N. Lindley, expenses, Committee on Horticulture	9 68
James Troop, expenses, advisory board experiment orchard	7 50
S. Johnson, expenses as delegate at Lafayette	2 50
Mrs. M. J. Ferguson, expenses as lecturer at Lafayette	7 88
Mrs. L. E. Deal, expenses as lecturer at Lafayette	7 49
F. A. Forbes, expenses, Committee on Horticulture	6 89
A. W. Shoemaker, expenses, Committee on Horticulture	6 25
Sam'l A. Hazelett, premiums paid at Lafayette	33 50
W. J. Ritterskamp, expenses, Committee on Horticulture	11 45
James W. Carter, expenses as lecturer	2 40
Prof. W. J. Green, expenses as expert judge	3 00
H. H. Swaim, expenses as President	9 50

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Sam'l A. Hazelett, expenses as Treasurer	$6 00
J. J. Milhous, expenses, Committee on Horticulture	5 90
J. M. Snodgrass, expenses, Committee on Horticulture	4 15
L. B. Custer, expenses, Committee on Horticulture	4 80
W. B. Flick, third quarter salary	225 00
Joe A. Burton, third quarter salary	62 50
T. A. Coleman, president Farmers' Legislative Committee, expenses incurred in assisting Legislative Committee	14 00

W. B. FLICK, Secretary.

H. H. SWAIM, President.

Experiment Orchard, Orleans, Ind., August 30, 1907.

The Board met for the purpose of inspecting the experiment orchard and to confer as to the future work to be carried on there. Arrangements were made by which Purdue Experiment Station will co-operate in the work and keep the proper records of the experiments. Superintendent Burton made report as to the work done the last year (see his report, page 124, which was approved. A contract with Joe A. Burton was submitted and laid over to the annual meeting for further consideration.

The following bills were filed, examined and allowed:

Jas Troop, expenses as member Executive Committee	$8 25
E. Y. Teas, expenses as member Executive Committee	9 00
H. H. Swaim, expenses on Board of Horticulture	12 85
Sam'l A. Hazelett, expenses on Board of Horticulture	6 32
Walter S. Ratliff, expenses as member Executive Committee	9 20
W. B. Flick, traveling expenses, Blythe, Barnard, etc	26 85
C. M. Hobbs, expenses as member advisory board experiment orchard	5 25
Ella Shera Green, stenographic work, Lafayette	30 75
R. V. Simpson, expenses, advisory board, experiment orchard	8 70

W. B. FLICK, Secretary.

H. H. SWAIM, President.

Indianapolis, Ind., Dec. 5, 1907.

The Board of Horticulture met immediately after the adjournment of the annual meeting of the society. Present: W. C. Reed, L. B. Custer, Sam'l A. Hazelett, W. B. Flick, E. Y. Teas, W. C. Ratliff and Prof. Jas. Troop. Prof. James Troop was chosen to succeed himself as a member of the Advisory Board of Control of the Experiment Orchard.

A contract with Joe A. Burton as superintendent of the Experiment Orchard for the ensuing year, which was submitted to the Board meeting

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at Orleans, August 30, 1907, and referred to this meeting for action, was approved and ordered filed in the secretary's office.

The following bills were filed, examined and approved:

W. B. Flick, Secretary, postage	$38 50
Sentinel Printing Co., printing and office supplies	6 30
W. B. Flick, salary for August and September, 1907	150 00
Joe A. Burton, superintendent experiment orchard, salary for August and September, 1907	41 34
Sam'l A. Hazelett, expenses as member Board of Horticulture	4 40
W. C. Reed, expenses as member Board of Horticulture	10 00
Jas. Troop, expenses as member of Executive Committee	4 75
R. A. Troth, services on Auditing Committee	7 50
Walter A. Ratliff, expenses as member Executive Committee	7 20
H. H. Swaim, expenses, Board of Horticulture and Fruit Special	20 00
Joe A. Burton, expenses, superintendent experiment orchard	5 50
L. B. Custer, expenses, Committee on Horticulture	3 40
A. W. Shoemaker, expenses, Committee on Horticulture	1 70
Chas. N. Lindley, expenses, Committee on Horticulture	12 45
H. W. Henry, expenses, Committee on Horticulture	11 10
E. Y. Teas, expenses, Executive Committee	5 00
J. J. Milhous, expenses, Committee on Horticulture	1 25
Elmer G. Tufts, expenses, Committee on Horticulture	7 50
Elmer G. Tufts, expenses, Committee on Fruit Special	13 50
Sentinel Printing Co., printing and office supplies	31 10
W. B. Flick, Secretary, office expenses	23 62
J. C. Grossman, Committee on Horticulture and Awarding Committee	15 75

W. B. FLICK, Secretary.

H. H. SWAIM, President.

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REPORTS BY MEMBERS OF THE COMMITTEE ON HORTICULTURE, 1907.

REPORT FROM FIRST DISTRICT.

The interest in our district, so far as commercial horticulture is concerned, is centered mainly in melons, thousands of acres being annually planted to cantaloupes and watermelons. While the years 1905 and 1906 were very discouraging to growers, the aphis and wilt destroying almost whole fields just as the harvest began, the past year has been very favorable and renewed interest is shown throughout the district. Through the horticulture department at Purdue, preventive measures were sought, and much work done and good accomplished through Mr. C. G. Woodbury, assistant horticulturist at Purdue. The very existence of the industry was threatened two years ago, but growers are hopeful again, as in 1907 some of them realized a net profit of from $150 to $200 per acre from melons, and as some operators cultivate fifty to one hundred acres it means quite an income.

Tree fruit culture is being woefully neglected. The soil and climate are favorable to the growing of choice apples, but there are few devoting their time and thoughts to this branch in a commercial way. I think the reason for this is partly or mostly a lack of knowledge how to combat insect and fungus enemies; then lack of organization and co-operation. With good fruit lands to be had for from twenty-five to forty dollars per acre within easy reach of railroads and markets, such as Evansville, Louisville, Indianapolis, St. Louis and Chicago, in the district, and just outside its borders, with cold storage accommodations to hold winter fruit until the price is acceptable, these are advantages in this line of horticulture that are exceptionally good from a business standpoint.

Small fruits are receiving some attention in a small way for local markets, and as farmers are becoming customers for these fruits in addition to the active demand in our cities, there are splendid opportunities in this line. Some lands in our district have been cleared, and corn and wheat grown thereon, that had better been left in timber on account of their hilly character. By planting such lands to blackberries and raspberries they can be made profitable and the washing away of the soil stopped to some extent.

In the past ten years several thousand acres were set to Keifer pear trees. Some of the land on which these trees were set was low, black, rich soil, worth one hundred dollars and upward per acre. The trees on such land show more blight and are not doing as well as on the hilly upland, and the owners of such orchards are discouraged. Where Keifer pear trees were set on rolling upland the trees have borne paying crops almost annual-

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ly since they were five or six years old. I believe if southern Indiana had the horticultural societies that the northern counties have there would be a wonderful development in profitable commercial horticulture throughout the First District. W. J. RITTERSKAMP, C. H.

REPORT FROM SECOND DISTRICT.

On account of early warm weather, followed by very heavy frosts and prolonged cool weather, last spring, most of the fruit crops were killed. We seldom have such a total failure in all of the fruits as we had during the past season. It was peculiar in that the peaches stood the frosts better than the apples.

It was very noticeable that the orchards which did yield fruit were the orchards which, during the previous year, had been receiving special care in pruning and spraying. But there were many exceptions to this. A great deal depended on the varieties that one had in his orchard. For instance, it was noticeable that apples that bloomed late or those which bloomed during a long period bore best. I might mention among the best varieties, Winesap, Rome Beauty, York Imperial, Janet and Grimes Golden.

This was a record-breaker year for prices on apples. Many sold as high as $3 per barrel on the trees, taking them as they run; others sold at packing time for $4.50 to $5 per barrel for No. 1. Grimes Golden drops were peddled on the streets of Vincennes at $1.60 per bushel. Hon. Wm. B. Robinson had about 2,000 bushels of good apples this year, for which he received enormous prices. Pears, cherries and most berries, except wild blackberries, were a failure.

The special train which was run by the Experimental Station of Purdue and the Indiana Horticultural Society seemed to meet with the approval of all fruit men, and was appreciated and greatly beneficial to our district. We all say, come again.

Land is rapidly increasing in value in our district, which condition is naturally followed by more planting of ornaments; but for some reason the planting of small fruits and home orchards has not kept pace with other developments. Many know they must spray if they get fruit, and prefer to buy the fruit rather than give the necessary time and attention to an orchard. But they buy very little.

Many are planting a few acres of their waste lands to Black Locust and Catalpa Speciosa, which I believe is a very wise and profitable thing to do. Every farmer should plant out enough Locust or Catalpa Speciosa to supply his farm with posts. The Black Locust seems to be taking the lead. The only drawback to it is the borer, which attacks the trees in some neglected groves. These borers can be almost fully eliminated by keeping

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the land clear of golden-rod, as this weed is an ideal breeding place for these insects.

I believe that the horticultural society can do the most good to our fruit interests by giving lectures and spray demonstrations in our district. It is of great importance that we emphasize the necessity of more spraying, more thorough spraying, higher pressure, better chemicals, more careful spray mixtures.

This district is especially adapted to the Winesap, Rome Beauty and Grimes Golden apples. R. A. SIMPSON, C. H.

REPORT FROM THIRD DISTRICT.

The third horticultural district is composed of the following counties: Perry, Crawford, Dubois, Orange, Harrison, Clark, Floyd, Scott and Washington. Five of these counties border upon the Ohio river and are very broken in surface conditions. Clark, Floyd, Scott and Washington counties have what are termed Knobs, a very rough and uneven surface, that continues in almost a chain of high hills. Many of these points are ideal locations for fruit growing. Being high above the valleys, they escape the spring frosts and freezes that are so often the bane of fruit growing.

Much of this entire block of counties is termed a clay, limestone soil, but some sections are made of rich loam, which has been originally covered with black walnut and sugar tree timber. This forest has been largely removed in the past few years and at present these fields are being farmed by the various systems. Trees seem to be a natural production of these hillsides, and their quick growth is almost marvelous, and we can at once infer that this is a good point for the orchadist.

The rolling surface of much of this land is not adapted to continuous grain growing, as has been practiced by a large number of owners, but should be directed to different methods, which would prove much more profitable in the end. Corn is being raised upon much of this land, year after year, with not more than 15 to 25 bushels per acre, while the land is wasting very fast by washing, being exposed bare so much of the year. Habit and custom of our forefathers plays quite a part still in our manner of farming, and a change can only take place after a thorough lesson is taught, that to continue this old practice is many times done at a loss in the end. Much of this land can be purchased now at from $10 to $40 per acre, and we are sure and know that much of it could be most profitably planted to fruit trees, and the results would be most gratifying to the owner. The apple market for the past few years has been most encouraging, and with proper care in grading fruit for market they have brought the grower from 75 cents to $1 per bushel net. When we figure an acre at the least production (100 bushels) we can see a very handsome profit. I find the

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greatest trouble with parties having a small acreage in fruit depending too much upon local markets, and receiving such a small price are soon discouraged and say it don't pay. Local markets in towns from 1,500 to 6,000 inhabitants are soon glutted. To illustrate: In the year 1905, while I was selling my apples (big and little) at Louisville for $1.25 per bushel, others were selling at home markets for 40 cents to 50 cents per bushel, for just as fine as mine were. I firmly believe that organization and co-operation are the greatest factors for the fruit producer to seek, and with a good man to look after the markets and shipments, many dollars could be made and saved.

Floyd County has quite a number of berry growers and many cars are shipped north early in the season at a profit to the grower of from $40 to $125 per acre. Cities with a population of from twelve to twenty thousand have been the best points for small shippers, but large shipments go to Chicago. New Albany is the chief shipping point for the berries, and frequently 5,000 to 7,000 crates go out per day. Strawberries are the most grown of the small fruits.

In Washington County J. Emmet Reyman and W. W. Stevens each have over forty acres planted to apples. Mr. Reyman has the thriftiest looking trees I ever saw. They all look as if they had been polished, and vary in age from five to ten years. Mr. Stevens' orchard has been set four years and is making a fine showing. Peach growing has declined some the past few years, though this district has been one of the greatest peach sections in Indiana. An occasional severe winter kills the trees badly and thus the business has declined. A few years parties have realized a profit of over $150 per acre.

I have written quite a number of persons in the counties outside of Washington county, but received only four answers. The questions asked them were the same as found on page 107, 1904 report. The following are the replies:

J. L. Burton, Orleans, Orange County, reports: This section of Orange County takes quite an interest in horticulture, and would say that we are advancing, while in the south half of the county little or no progress is being made. Farmers are generally supplied with orchards for family use and are fairly well cared for. Only one commercial orchard now bearing, owned by Frank Baker, Orleans. Mr. Baker claims it to be a profitable investment. Some new plantings. Land can be had at $15 to $100 per acre. There is no local horticultural society. We have about 6,000 people in towns depending for fruit on outside or surrounding country. The towns are Orleans, Paoli, West Baden and French Lick Springs. The soil and general topography of the county is well adapted to fruit growing. Apples are more generally grown than any other fruits.

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J. W. Grable, Corydon, Harrison County, reports the following: The fruit growing territory of this county is mostly situated in Washington township, which is ten to fifteen miles from where I live. I am unable to give you the principal fruits grown there. There has not been any advancement in horticulture in this county, but farmers are generally supplied with orchards, but not with fruit gardens. Orchards are generally neglected and not many new plantings. Land for this purpose can be bought for from $10 to $50, depending upon location and soil. The public school grounds in most cases are neglected and no attempt is made to beautify them. No horticultural society in this county that I know of. What is needed most in this county is railroads or interurban lines to get fruit to market. The hills and valleys make this county an ideal place for fruit raising. Corydon, with a population of 2,500, to 3,000 depends on the country near for its fruit, and about half of the population depend upon the country for their garden supplies. New Albany and Louisville also draw on this county for some fruit and garden supplies.

J. R. Lyons, West Fork, Crawford County, sends this report: 1. Horticulture is in a condition of general decadence. 2. Yes, farms are pretty generally supplied with orchard fruit gardens, but the latter are not so general. 3. Frank Adams has fifteen acres. Aden Adams has about the same. Both live near Leavenworth. Jesse Ewing has ten acres near Leavenworth. The first two report the investment pays. Suitable lands for orchard purposes can be had from $15 to $25 per acre, depending on nearness to market. 4. No, not much. 5. None that I know of. 6. Some positive demonstration that a commercial orchard will pay. We have no cities and I think the entire population of all the towns in the county will not exceed 8,000. The principal fruits grown for commercial purposes are the Ben Davis and Winesap apples. Some grapes grown for market also. I can't tell you what the profits are per acre on those grown.

D. M. Lichlyter, Huntingburg, Dubois County, reports briefly: There is no organized horticultural society in this county. Here are a few of the names of the best fruit growers that I know in this county: Louis Eli, Hemmer, Holland; Isaac Cato, Huntington; Sampson Cox, Kyanna; B. F. Nicholson, Cuxco. These men have been the most successful growing fruit of any in this county. This is a very poor county for fruit and seems to be getting worse.

Summing up the above answers, there seems to be a lack of enthusiasm in this line of business, but certainly there is a great field open for horticulture in this district, and one that would be of much profit to anyone who will give it the proper attention. The idea has been too prevalent that set out a tree and all one must do is to go gather the fruit, without any

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further attention. That day is past, and horticulture, to be successful, must be given the same attention that other branches of farming calls for. When there are persons who annually receive from $75 to $150 per acre clear profit, others can do the same. I want to emphasize the thought that organization and co-operation will bring about a result that will be both satisfactory to seller and buyer alike.

LIST OF FRUIT BEST SUITED FOR THE THIRD DISTRICT.

Six Best Apples—
- Rome Beauty,
- Grimes Golden,
- Winesap,
- Janet,
- Yellow Transparent,
- Ben Davis.

Six Best Cherries—
- Early Richmond,
- Dye House,
- Montmorency,
- May Duke,
- English Morello.

Six Best Peaches—
- Amsden,
- Early Rivers,
- Elberta,
- Old Mixon Free,
- Stump of the World,
- Heath Cling.

Six Best Plums—
- Wild Goose,
- Blue Damson,
- Shropshire,
- Shipper's Pride,
- Moore's Arctic,
- Robinson.

Six Best Pears—
- Kiefer,
- Seckel,
- Howell,
- Osborn's Summer,
- Anjou,
- Duchess de Angouleme.

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Three Strawberries—
Crescent,
Warfield,
Gaudy.

CHAS. N. LINDLEY, C. H.

REPORT FROM FOURTH DISTRICT.

To the Members of the Indiana Horticultural Society:

The Fourth Horticultural District includes the counties of Dearborn, Ohio, Switzerland, Jefferson, Ripley, Jennings, Jackson, Bartholomew, Brown and Johnson.

These counties are essentially a fruit-growing district. Here we find the necessary conditions to make commercial orcharding, small fruit growing and gardening a success—suitable soils, cheap lands, climatic conditions and market facilities.

This district, in fact each county, offers soil suitable to the different varieties of fruits and vegetables. We have the rich bottom lands, which overflow from the Ohio, Miami, White Water and White rivers, with their tributaries. Extending from these rich, fertile valleys we find rich elevated clay soil, so well adapted to fruit. Here on these hills we again find a variety of soils, climatic and surface conditions. We have the yellow clay, white clay, black loam, the true limestone soil, with its fine stone of fossil formation. We find the high table land suitable for the apple and peach. The southern and eastern slopes for the early, and the northern and western for the late fruits and vegetables. The sandy soil of Jackson county for the melons. Johnson and Bartholomew counties for the tomatoes.

The above-named rivers give good surface drainage to the entire district, and by the high elevation of the hills we secure the air drainage so essential to successful fruit growing. This high elevation and nearness to the rivers produces a warmer temperature and the early frosts of spring and fall are warded off, which is very important. Experience has taught fruit growers that hill land is best suitable for growing fruit, as the cold, damp air flows down hill readily and settles in the valleys, thus reducing the exposure on the hills, and annual crops may be expected with a reasonable degree of certainty if the orchard receives attention.

In this district we find cheap lands ranging from $15 to $100 per acre. The low lands are most valuable, and while at present used only for corn, are adapted to some of the garden crops and sweet corn and late cabbage, and especially the latter. The high lands are the cheapest and best adapted to fruit.

We may raise an abundance of fine fruit, but unless we have a market it will not be a profitable enterprise. In the fourth district, however, we find good, nearby markets in most of the counties. Among these are North Vernon, a manufacturing city and railroad center for the district; Colum-

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bus, Seymour, Madison, Lawrenceburg and Aurora, each a manufacturing city, which could consume many times more fruit, and especially apples, than is produced in the entire district at present. There are many smaller towns in each county offering a good local market for a limited amount of fruit. We are at the doorway of large commercial centers, with good railroad facilities to these large distributing points.

Three systems of railroads pass through this district east and west, north and south. The main line of the B. & O. S. W., running through the central part of the district, through the counties of Jackson, Jennings, Ripley and Dearborn, to Cincinnati, the doorway to the east, and within twenty miles of the eastern border of the district, and to Vincennes and St. Louis on the west. The B. & O. S. W. also extends from North Vernon to Louisville and the south. We are connected with Indianapolis and Chicago by the Pennsylvania system and the Big Four, one line of the latter extending from Madison, on the south, almost through the central part of the counties of Jefferson, Jennings, Bartholomew and Johnson, to Indianapolis, which is within ten miles of the northern boundary of the district. Four counties, Dearborn, Ohio, Switzerland and Jefferson, border on the Ohio river, and thus give cheap transportation to Cincinnati.

Thus we here find all the conditions essential to the growing and marketing of the finest fruit at the largest profit.

The possibilities of fruit growing in this district are wonderful, when we study the situation. Let us take Dearborn county, which is an average as to conditions. It contains two cities each of 5,000 inhabitants, depending upon the surrounding country for food, thus creating a good local market. It is within forty minutes' ride of Cincinnati and within easy reach of Indianapolis and Chicago.

Some little fruit is grown at present, principally in the extreme southwestern and northern part. On the eastern side of the county we find the broad, low bottom lands of the White Water, Miami and Ohio rivers. While these lands at present are only used for corn, and the higher portions for hay and wheat, yet they are well adapted to canners' crops, such as sweet corn, tomatoes, pickles and cabbage. If the farmers could be induced to grow these crops, there could be established canneries in this territory, giving employment to men, women and boys, and also return a larger revenue to the farmers.

The southern half of the county is cut up into long, narrow ridges, by three creeks running easterly and emptying into the Ohio near Aurora. These ridges are four or five hundred feet above the valleys on either side, with clay limestone soil. Here is an ideal location for the apple and peach. Part of this soil is suitable for early garden crops, which find a ready sale at high prices.

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Good macadamized roads pass through this territory leading to the towns, railroads and river, which give access to the markets at all seasons of the year.

The central part of the county is more broken and hills steeper. The main line of the Big Four runs through this part with a place for good shipping facilities at Guilford and Weisburg. Ordinary farm crops cannot be produced here at a profit, but it is fine for fruit. Catalpa and Locust would also be profitable. The northern part of the county is more level, and we find more of the white clay soil. Some apples are produced here at present, but not enough to induce buyers to come in and compete with one another.

This county is also well adapted to tomatoes and other canners' crops, apples, peaches, pears, cherries and small fruits.

The fruit crop the past season was almost a failure. Some varieties of strawberries, like Crescent and Senator Dunlap, produced a large crop, but most varieties, owing to late frost, were an entire failure. Prices ruled high. Good crop of raspberries and blackberries. Extra early tomatoes a good crop and prices high. Late tomatoes a half crop, owing to poor plants and lateness of setting. Summer apples, yellow transparent, full crop.

No winter apples where the orchards were not cared for. Where cared for and sprayed a small crop, which sold at high prices. No peaches. Cherries a failure owing to freeze. No plums. No pears. Even the Kiefer failed.

The "Fruit and Soil Improvement Special," run over the B. & O. S. W., November 19, 20 and 21, made ten stops in the fourth district, and there were large and interested audiences at each stop.

There is no question but what southern Indiana can produce fine fruit profitably, and it now remains for this Society to take some definite steps to interest, educate the people and stir them to action along horticultural lines. I believe this society should conduct a horticultural institute for one day in each county, or at least in the fruit section of the state, where fruit subjects can be talked about and discussed and demonstrations made, confining the topics to strictly fruit subjects. We have the Farmers' Institutes, it is true, but from the very nature of these meetings they must discuss a variety of subjects and thus have but little time for horticultural interests.

This society could furnish one or two speakers, expenses paid, and the county or locality where the meeting is held meet all local expenses. We would in this way get in direct touch with those interested in horticulture and more likely to help them.

We have but few at our meetings here and they are about the same

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ones each year. No young people. This proves, to me at least, that we must take our work to the people, and not wait for them to come to us, and I know of no better way than theplanabove referred to.

ELMER G. TUFTS, C. H.
Aurora, Ind.

VARIETIES OF FRUIT RECOMMENDED FOR THE FOURTH DISTRICT.

Summer Apples—Yellow Transparent and Benoni.

Fall Apples—Wealthy.

Early Winter Apples—Grimes Golden.

Winter Apples—Winesap, Roman Beauty and Ben Davis.

Pears—Kiefer.

Peaches—Alexander, Old Mixon, Elberta, Wheatland, Globe and Crawford's Early.

Plums—Damson, Green Gage, Shropshire Damson, Lombard.

Cherries—Early Richmond.

Strawberries—Warfield, Haverland, Bubach, Dunlap and Gandy.

REPORT FROM SIXTH DISTRICT.

Greenfield, Ind., Dec. 4, 1907.

To the Indiana Horticultural Society:

Your committee begs leave to make the following report: When we received a letter from your secretary outlining the work he wanted us to do, we at first said we can not do it. We have not the time or the data at hand, and besides we have not the ability, as it is entirely out of our line of business.

The land in our district is undulating or rolling, not rough and broken as it is further south. The soil is generally a sandy loam, underlaid with a yellow subsoil, and in places heavily laden with iron. This land is fine for fruit of all kinds grown in this climate. Apples are high colored and fine flavored.

We have railroads and interurban lines running through the district, short distances apart and convenient. The farms along the interurban lines are being cut up into small farms of from ten to twenty acres, especially along the line running from Indianapolis to Richmond, and many fine homes are being built. Fruit trees and vines are being planted, which will in a few years blossom and bear fruit.

We have many flourishing towns and growing cities with extensive manufacturing interests which will make a good market for all the fruit that will be produced.

We have good schools and church advantages. We believe any one looking for a home that they can enjoy life in cannot do better than to

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invest in one of these small farms and go to raising small fruits and vegetables, planting fruit trees and vines, which will in a few years yield an abundant income.

J. F. COFFIN, C. H.

REPORT FROM SEVENTH DISTRICT.

The Seventh District is composed of Marion county only, with a population of probably 250,000. We have quite a variety of soils, sandy loam, rich bottom, sugar tree loam, white oak and beech. A few square miles are quite broken, but nothing so broken but what it will produce good grass. Indianapolis, with a population of more than 200,000 is a manufacturing center, where all who desire, as a rule, can find employment, from the man who carries the hod, or the Hunyak who slowly moves his shovel filled with gravel, to the man who works with the most delicate piece of machinery. With the humdrum of busy life, when the whistle gives notice of midday or six o'clock, these busy toilers are ready to partake of a repast which comes largely from the farmers who are to be found in Marion county. There are more small farms in the Seventh district than in any other district in the state, considering the size of the district. Many of these farms range in size from five to twenty acres, and yet the owners of most of them are industrious people, many of them selling produce to the value of $300 per acre or more. There are thirteen steam railroads and ten interurban railroads, with more coming, centering into Indianapolis, giving the producer every facility he can desire to ship his produce to the city, or if he desires to ship it to our towns he can reach them every hour of the day. Land prices are rather high, ranging from $100 to $1,000 per acre, and yet at these prices for land the progressive farmer can make a better per cent on his investment than the banker or manufacturer. A few items may be of interest. There were 800 acres of peas grown in 1907, which made an average of 200 bushels per acre, which, at canners' prices, 32 cents per bushel, would make $47,200. Two thousand and twenty-six acres were planted to potatoes, which made a yield of 163,210 bushels, which gave the farmers $114,270. One thousand six hundred acres were planted to tomatoes, with a yield of 200,000 bushels, which brought the farmers $50,000. Ninety acres were planted to cantaloupes, but owing to blight and bugs the crop was cut quite short. As a rule the quality was fair to good and prices were very satisfactory throughout the season, at times selling as high as $6 per barrel. I should think the crop would exceed 8,000 baskets, with an average of $1 per basket, making $8,000. Fourteen acres were planted to watermelons, largely for home use, and yet several thousand were sold at fair prices, safe to say $1,000. Sixty-one acres were planted to onions, which were mostly

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bunched and sold green. The market was very good and the growers realized several thousand dollars for their crop. The acreage and crop of strawberries and raspberries was not as large the past season as usual, but the prices of fruit were very satisfactory to the grower, $4.50 per crate of twenty-four quarts being about the top price, while some inferior berries sold as low as $1 per crate. Fine home-grown blackberries sold from $1.25 to $2.50 per crate.

We have in the district 119,398 fruit trees of all kinds, about two fruit trees to every three persons, divided as follows: Apple trees, 40,538; pear, 16,066; plum, 7,426; peach, 19,882; cherry, 21,566; all other fruit trees, 3,920. When we consider the fact that not one out of fifty of these trees are properly cared for, and that many of them do not bear at all, we wil- see at once that the tree fruit of the Seventh district is very shy for the population. This year, which was an exception, there were only about 9,000 bushels of apples, while plums, pears, peaches and cherries were almost a total failure.

Mr. W. B. Flick, Lawrence, has the largest commercial orchard in the district. This orchard is well sprayed, trimmed and cared for, and is quite profitable. Jesse Dye has a commercial orchard at New Augusta, which is just beginning to come into bearing. There are one or two other orchards in the district with the thought of growing apples for profit. There is a woeful lack of shade trees along the highways, and the school grounds generally have the appearance of a desert waste. With our splendid schoolhouses, up to date from cellar to garret, and concentrated schools, the citizens of Indiana should not be satified until our school grounds become a place of beauty, cared for by a man who is employed to have the care of the house and grounds the year round.

J. J. MILHOUS, C. H.

REPORT FROM EIGHTH DISTRICT.

The Eighth District comprises the counties of Madison, Delaware, Randolph, Jay, Blackford, Wells and Adams, and occupies the middle eastern part of the state, having about sixty-five miles bordering on the State of Ohio. Its surface is generally level to gently rolling. It contains the head waters and upper courses of the White, Salamonia and Mississinewa rivers, with their numerous branches. There is little if any land that can not be drained into one of these streams. Perhaps no similar area of land in the state contains more fertile land than this district. There are whole townships of thirty-six square miles that contain not one acre of untillable or waste land.

The soil is clay, variegated with black, and is rich in plant food

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not worn by long tillage with no addition of humus. With under-drainige and proper tillage soil is unsurpassed for production of all the grains, grasses, fruits and nuts of the temperate climate.

In this district, since the discovery of natural gas twenty years ago, have grown up a number of large and flourishing manufacturing cities. From small country trading places and county seats of from 1,000 to 5,000 population to cities of from 5,000 to 30,000 have grown up. These manufacturing cities furnish a local market unsurpassed by the larger city markets.

Production of fruits has not kept pace with this wonderful growth. Into these cities a large part of the fruit and food supplies needed is shipped from other sections instead of being supplied by adjacent farm lands. It is estimated that not more than 10 per cent of the apples consumed are home grown, 90 per cent being shipped in from apple-growing regions. This is largely due to the decadence of old orchards planted by early settlers and the failure to plant and properly care for young orchards. It is known that the apple can be very profitably raised here if proper care is given it, as is shown by orchards planted by the early settlers.

Cherries and pears do well and the supply is not equal to the demand, save, perhaps, in the case of Kiefer pear, which has been largely planted, and sometimes becomes a drug on the market in seasons of good crops. This year, however, the Kiefer was almost a total failure and brought from $1.75 to $2 per bushel in the market.

Small fruits are not raised in sufficient quantities to supply the demand in most localities. Strawberries, perhaps, are nearest grown in quantities equal to market demand in their season. However, considerable quantities of them are shipped in from the south before the home-grown berry comes on the market. Blackberries and raspberries are always short in supply and are shipped in in considerable quantities.

There are few commercial orchards in this district and those mostly Kiefer pear. Apple orchards consist almost entirely of small orchards of 100 trees or so for home use. The farmer usually gives it so little attention, however, that only when seasons are very propitious does he have his own wants supplied. Indeed, generally throughout this district, the farmers furnish quite a considerable part of market for fruits, both tree and small fruits.

A. W. SHOEMAKER, C. H.

Daleville, Ind.

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REPORT FROM NINTH DISTRICT.

December 5, 1907.

To the Indiana Horticultural Society:

If it were possible to present to you a birds-eye view of the Ninth district, you would see, here and there dotting the fair landscape, a few straggling, scrubby trees, the remnant of our once magnificent forests. This great forest domain just a few years ago was one unbroken solitude, except for the chirping of our native songsters and the occasional ring of the woodman's ax as he cleared away the spot for his primitive cabin home. And there, in nature's own domain, he planted his orchard and fruit garden. Nothing to bother and hinder in any way the rapid growth of the trees, and an early and abundant yield of delicious and faultless fruit.

Nature had provided both soil and fertilizer, and insecticides and cultivation was not necessary in the early growth of the orchard because of the limited amount of cleared land. Thus our pioneers were driven by dire necessity to perform the only act that nature had not already performed for them for the best results in orchard and fruit production. This section of Indiana was then considered a good fruit country, and it was; and if this part of the state produced good fruit, then, why will it not produce good fruit now? This is the question that is being asked by our Indiana farmers everywhere. It is of rare occurrence that you find a man who has even a rudimentary knowledge of how to plant and care for an orchard. Let us take another panoramic view of the country and see what kind of an answer the conditions warrant. As we look into the farm orchard of today we observe that of all the farm industries this is the most sadly neglected. A few straggling trees of forty or fifty years ago. With decaying trunks and broken branches, they stand as a breeding place for all the orchard enemies that fruit trees are heir to. I have seen such trees entirely stripped of their leaves and so full of tent caterpillars that they were actually starving to death. In many of these old orchards you will see a feeble effort to reset with young trees. There, in a blue grass sod that is of several years' standing you will see a few straggling trees, not any larger than when they came from the nursery, although they may have been there for several years. And in addition to this sad neglect, this horrible excuse for an orchard is used for a hog lot, calf lot, cow pasture, and, in fact, everything is turned into the orchard that is not otherwise provided for. Farmers, do not complain if your orchard is a failure, for how could it be a success under such horrid management?

This is not the universal condition in this section of Indiana, but, sad to relate, it is so nearly so that the sight of a model orchard is a very rare occurrence. And what is said of the orchards can be said of

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the fruit gardens. Neglect is the cause of failure everywhere, not only in the orchard and fruit garden, but in all other occupations as well.

But can we produce good fruit in this section of Indiana? I answer, yes. Let farmers give their orchards the same attention that they do their corn fields and they will have an abundance of just as fine fruit as was ever grown in the old primitive orchard. I was talking to one of our fruit growers who told me that his gross receipts from two acres of strawberries was $900. What this man has done others can do. We have all kinds of soil in the district, and often it will be found on the individual farm, ranging from a black loam to a stiff or sandy clay. Those of our farmers and fruit growers that are practicing up-to-date methods are making a handsome profit on fruit. In my orchard I have picked four successive crops of peaches, and other growers have done even better than that. Plums are a universal crop and are very profitable, but the demand far exceeds the supply. Thousands of baskets are shipped to our towns and villages from other states. In fact, I can see no reason why all the fruit that we can use should not be grown within our district boundaries, except the tropical aud subtropical fruits of the southern and Pacific states. Scattered throughout the district are many large towns and cities that are a splendid market for fruits of all descriptions. In fact, nearly all of the fruit that they get comes from some other part of the state, or from other states. No other field of industry offers so good an opportunity for pleasant, congenial and profitable investment for both labor and capital as that of growing fruit, for not alone the town and city trade, but the country and farming sections will take a large amount. Many of our fruit growers are selling nearly all of their fruit now to those that ought to be growing it, not only for their own use but for the market. I usually sell fifty to one hundred cases of strawberries and all of the other fruits that I have without the trouble of delivering to the towns or railroad station. Farmers sometimes come for fifteen miles to get a bushel of fruit that they had just as well have grown as not.

Let the farmers of this section of Indiana study the question of fruit growing as they have that of raising corn and hogs and its will not be long until we will be enjoying big red apples as our grandfathers did in the early days. Respectfully submitted,

J. M. SNODGRASS, C. H.

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REPORT FROM ELEVENTH DISTRICT.

It is a very difficult matter to make a satisfactory report from this district. In this part of the state we have not had a full crop of either apples, pears or peaches for several years, for various reasons. We have been more fortunate in regard to small fruits. On account of the continued cold, frosty, wet and backward spring, the fruit crop for the year 1907 was almost a complete failure in the most of this district, with the exception of small fruits. Apples cannot be placed at more than 10 per cent of a crop; pears, 10 per cent; peaches, 15 per cent; plums, 10 per cent; small fruits: blackberries, 100 per cent; raspberries, 90 per cent; strawberries, 45 per cent; grapes, 60 per cent., but very wormy.

Orchards generally are not given the proper care and attention, principally on account of scarcity of farm labor. The farmers as a class seem to be compelled to devote all of their time to other growing crops and neglect their orchards. Spraying is practiced to a limited extent, generally with satisfactory results; but the past wet season, there being such frequent rains, the results were not very satisfactory.

By correspondence I am able to give the following report from the different counties in this district:

Mr. G. N. Moyer of Wabash County states: We had no fruit in apple, pear, cherry or plum to speak of. Apple orchards are in only fair condition, as they are but little cared for. Some little spraying. Pear trees look fairly well. Cherry and plum are on the down grade. Have not done well, and many trees are on the decline. Cherry, I think, is caused from loss of leaves from wet weather, as also blue plums.

Strawberries were from one-third to one-half crop, with fair fruit and good prices.

Raspberries an average crop. But few plantings in this part of the country. Blackberries only a partial crop. But few currants and gooseberries. We have no scale in our locality that I know of.

From Miami County Mr. E. R. Gustin writes: The commercial orchards in this county are in good condition, and I think free from disease. The small orchards, with very few exceptions, are in bad condition, having had no care. There is some San Jose scale in several of the smaller orchards.

The small fruit plantations are in better condition than usual, but the acreage is very light compared with a few years ago. Apple crop light, perhaps 25 per cent of crop, and very inferior in quality, except where trees were sprayed. No pears. No plums, but the trees are in good condition. Very little blight on pear trees this season. Peach

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about 50 per cent. of crop, and very fine, except the seedlings, which were very inferior.

Small fruit about 75 per cent of full crop, and very fine. You ask if I spray. Yes, I always spray, and the results are very satisfactory. I have several acres of currants bearing, and I spray, not to kill the worms, but to prevent their appearance. I never bothered with the worms on the bushes. The freeze injured my crop this year, but had something over half crop of very fine currants.

My apple orchard of something like 3,000 was only four years old last spring. I have sprayed at least three times each year since the trees were planted. This year I had some very fine specimens of Yellow Transparent, Wealthy, Wagner, Jonathan, York Imperial, Indian, Stark, Grimes Golden and Gano.

Mr. Oliver Kline, Huntington, writes: Condition of orchards—Orchards as a rule are not well kept. Old orchards going down and not enough new ones planted. Not many extensive berry plantations. Apple crop short, not more than one-eighth of crop. Pears almost a failure. They sold at 75 cents per peck in Huntington market. Peach crop very good; sold as high as $2.25 per bushel. Plums a failure. Cherries a failure. Small fruits: No raspberries; bushes diseased. Plenty gooseberries. Some currants. Plenty blackberries. Grapes, one-half crop; wormy.

I have followed spraying for several years with good results. The results of spraying are to be seen in the quality of fruit produced. We have no San Jose scale here.

From Grant County Mr. Ran Banog writes: Apples here nearly an entire failure. I have done no spraying in about five years. Last year raised about 150 bushels of Ben Davis apples, and about eighty per cent were free from codling moth, and I did not spray, and when I did spray about fifty per cent were free from codling moth. This year I had only one tree—Smith's cider—that bore eight bushels, nearly entirely free from codling moth. I think the codling moth has about had his day, or Isaac Wood's spiders of Summitville have devoured them, as he has a breed of spiders that prey on them. The pear crop was a failure. I only raised six bushels free from codling moth. Have had blight very bad here for last four years. One of my neighbors had a pear orchard eight years old, and had the blight. Last year he had a tree he concluded to kill with crude oil. He put the oil on the tree and the blight ceased, so this year he applied the oil to all the trees with a brush, and today his orchard is free from blight.

Plums—My Dawson trees died last year of blight. My other trees are

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healthy. Crop was a failure. Blackberries and raspberries—Crops good. Strawberries nearly a failure. Grapes very wormy and affected with black rot. Persimmons over month late. I have Little's Early Bearer and Martin's Golden Gem.

Mr. H. B. Swift, Hartford City, reports: Tree fruits in Blackford county were a complete failure, with the exception of apples, which were not over 10 per cent of a crop; blackberries, 90 per cent; raspberries, 75 per cent; strawberries, 40 per cent; injured by frost; grapes, 50 per cent of crop, wormy.

L. B. CUSTER, C. H.
Committee on Horticulture, Eleventh District.

REPORT FROM TWELFTH DISTRICT.

The Twelfth Horticultural District is composed of the counties of Steuben, Lagrange, Noble, Dekalb, Allen and Whitley, lying in the northeast corner of the state. These counties are bounded on the north by the state of Michigan, on the east by the states of Michigan and Ohio, on the south by the counties of Adams, Wells, Huntington and Wabash, and on the west by Wabash, Kosciusko and Elkhart.

The district lies in the glacial drift region of the Saginaw-Erie interlobate moraine. The drift ranges in depth from one hundred to six hundred feet, the deposition being very uneven, giving rise to numerous rounded hills, distinct ridges, and irregular valleys.

The general elevation above the sea level runs from eight hundred to eleven hundred fifty feet, and the hills and ridges rise above the intervening valleys and river beds from twenty-five to one hundred and fifty feet. The whole district is dotted with hundreds of beautiful lakes with areas of from a half acre up to five and a half square miles. These lakes are becoming noted far and near for their beauty and desirability for summer homes, and the population is numbered by the thousand each season.

The counties all have good, natural drainage through the Fawn, Pigeon, Elkhart, Blue, Salamonia, St, Marys, St. Joseph and Maumee rivers, and hundreds of smaller streams, and the natural drainage is being aided by miles of open ditches and tile drains.

The irregularity of the land surface and high elevation of the hills and ridges above the rivers gives an air circulation and drainage that is often very remarkable in its influence on growing crops. The lakes, too, have a great influence on the crops of the adjacent farms, especially in the fall.

There is probably no other district in Indiana that has a more fertile soil or as great a variety as these counties.

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There are hills, ridges, and level tracts of light sand, heavier sand and gravel soils, sandy loam, clay loam, gravel hills and ridges, heavy clay hills and bottom lands, and extensive marsh lands with their rich deposits of muck.

The sand, gravel and clay hills are very desirable situations and peculiarly adapted to the tree fruits, especially the apple, and there is probably not a farm in the district but what has a soil and location that will grow any of the small fruits, while the low black soils and muck lands, where drained, are very desirable for crops of celery, onions, mint and garden crops.

The district is noted for being one of the leading agricultural and stock districts of the state. But its natural resources of gravel beds, fine tile and brick clays, rich and extensive marl deposits and peat beds will, in the near future, bring it to the fore as a great manufacturing district also.

The district is traversed by a number of the leading railways, and electric lines are being built and projected to reach every part of the district, so that the shipping facilities are unexcelled by any other portion of Indiana.

The home markets are good, and not as well supplied with all the fruits as they should be, especially with good apples.

Originally the district was heavily timbered with valuable forests of walnut, poplar, oak, maple, beach, elm, hickory and others, but these have largely been removed, to the detriment of the county and climate; not more so, however, that in other districts.

When the country was first settled, one of the first things done by the early settler, after the log cabin was built, was the starting of an apple orchard of from one to ten acres, the scions and trees (and even seeds) being brought from the east (mostly New York), representing all the leading old varieties, and these grew luxuriantly in the new, rich soil, and bore abundantly for many years as fine fruit as man ever saw. The location, soil, etc., was so favorable for the growth of the apple that now, after a lapse of fifty to sixty years or more, some of the original trees still produce good crops of fine fruit of unexcelled quality in a favorable season, as many who are here today can testify from what they have seen exhibited at the State Fair and the St. Louis Exposition.

In those days the farmer gave his orchard the best and choicest acre on the farm, and had no codling moth or San Jose scale to battle with. Yet, with all the battles that have to be fought to grow fine fruit in these days, we believe it can be profitably done in the district now, by selecting the most favorable locations and giving the orchard the

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ONIONS GROWN IN NORTHERN INDIANA. (PAGE 234).

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best care possible with the improved methods and orchard tools and sprayers. A person must have capital to work with, and plant on large enough to secure a sufficient quantity of the best varieties to have carload lots. There are a few commercial growers in the district who have reaped some good harvests, and others who are just beginning to get results.

I have not the available data at hand to cite you to any particular crop and its value, but I wish to say, in conclusion, that a man with capital can find situations in the twelfth district equal to any in the state for growing some of the leading varieties of apples at a considerable profit.

Respectfully submitted,

J. C. GROSSMAN, C. H.

LIST OF VARIETIES RECOMMENDED FOR COMMERCIAL PURPOSES.

Apples—Yellow Transparent, Wealthy, Grimes Golden, Jonathan, Hubberston, King.

Pears—Clapp's Favorite, Flemish Beauty, Bartlett, Duchess, Sechel, Kieffer.

Peaches—Greensboro, Fitzgerald, Crosby, Elberta, New Prolific, Stump.

Plums—Abundance, Burbank, Wickson, Lombard, Bradshaw, Shropshire Damson.

Cherries—Early Richmond, Montmorency, Dyehouse, Windsor, Late Duke, Governor Wood.

Strawberries—General Dunlap, Haverland, Dornan (Uncle Jim).

REPORT FROM THIRTEENTH DISTRICT.

To the Indiana Horticultural Society:

The fruit production of the Thirteenth District was very much below the average in 1907. October 10, 1906, there came a fall of four to six inches of snow, accompanied by a temperature ten degrees below freezing. This was a great injury to fruit, as it had not been preceded by even light frosts, which would cut the leaves and cause the sap to go down. The effect was to greatly reduce the production of all kinds of hardy fruits, and in some localities young trees, especially peach, were entirely killed. The spring and summer seemed to bring an unusual amount of cold and moisture at unpropitious times. But, in spite of all these drawbacks, there were some apples and other fruits.

St. Joseph and Elkhart counties have local horticultural societies. Outside of these, the district is practically unorganized.

An effort is being made to place live horticultural topics and speakers on the programs of the Farmers' Institutes. It is to be hoped that

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a greater interest can be awakened in fruit growing, as the district is well adapted to it.

The agricultural lands of Texas, Dakota and the Canadian Northwest, and the wonderful mining propositions of the west are all beckoning to their golden opportunities. But fruit growing in northern Indiana offers rewards as certain and as bountiful as the best of them, with far less of the gambling element of chance than most.

Briefly these opportunities are:

1. Adaptability of soil and climate.
2. Certainty of market.
3. Transportation and other facilities.

When neglected and half-cared-for tree fruits of all kinds on the clay hills abounding in this part of the state bring forth good fruit with the abundance and persistence that they do, how bountiful would be the quantity, and how superlative the quality, were they but given the intelligent cultivation and care that would be in keeping with this age of progress!

This district embraces also peat, muck and sandy loam soils that only a few years ago could only be reached by boat. Thousands of acres of this land has been drained, and much of it is as yet producing only the wild native grasses. But hundreds of acres of just such lands near Hamlet and Hanna are now producing splendid crops of corn and other products. Potato and onion growing has been receiving more attenton on these lands in the last few years and have given profitable returns. In one instance a Mr. Osborn bought forty acres of land near Culver at $40 per acre. A part of it was planted to potatoes, which yielded 250 bushels per acre, selling at 40 cents a bushel at his nearest shipping point.

A. Mr. Myers planted five acres to onions. A May freeze greatly thinned but left a fairly even stand, which he was advised to destroy and plant potatoes instead. But he cared for his onions and received $500.00 for his product from five acres.

Mr. Newberg, near Tyner, planted two acres to onions. He and his small family tended them and his eighty-acre farm and he harvested 1,116 bushels, which brought him $446.60 on the cars at his nearest siding.

These are but instances that merely show the bountiful way in which our soil and climate will serve the wants of man when he but gives them the chance. The district is situated on the divide between the Great Lakes and the Mississippi systems.

Apples, peaches, pears, cherries, plums and other fruits thrive in the hilly portion. And lower lands not so well adapted to the tree fruits are yet ideal for most of the hardy small fruits.

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The seven counties in the Thirteenth district have a population of two hundred thousand, a little over one-half of which resides in the cities and towns. A few of these cities are now manufacturing centers of no little importance, and all must have fruit from some source. Even in years of abundance the grocers get large supplies of apples and other fruits that are grown in New York and other states, and instances of grain and stock farmers buying these fruits at the groceries for their own tables are not uncommon.

We need the grain and stock, but the man who will produce the first-class fruit, and lots of it, will have an immense home market before he need look for a foreign one.

When he has supplied this market, he will find the network of railroads crossing this portion of the state in all directions, and especially the great trunk lines connecting Chicago with the east, brings the world's markets to his very doors.

Horticulture, like any other business, has its problems to be solved and its difficulties to be overcome.

But the man who is looking for the opportunity to provide for himself by producing what the world wants and is willing to pay for, will look a long while before he finds a place where nature and man have done more in his favor. Respectfully submitted.

F. A. FORBES, C. H.

Plymouth, Ind.

REPORT OF LOCAL SOCIETIES, 1907.

ANNUAL REPORT OF THE LAGRANGE COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY.

The year which has just closed has been a very prosperous one in the history of our Society.

Financially it is on a sound basis for another year's prosperity. The members are active and very much interested in the work. Meetings are held regularly the second Saturdays of February, April, June, August, October and December. Have had a large attendance at every meeting during the past year and the programs have been more than full.

Premiums have been given at every meeting and the exhibits have been very fine. Seventeen dollars and fifteen cents have been paid in prmiums. Eight heads of families have been added to our membership list, which numbers 141 families at the present time. Amount of money in the treasury to begin new year, $96.55.

At the December meeting the following officers were elected and com-

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mittees appointed for the year 1908: J. W. Mills, president; John Schermerhorn, vice-president; Lewis Price, secretary; Myrta Vankirk, treasurer.

Executive Committee—C. S. Royer, Mrs. A. H. Bogue, R. R. Johnson.

Program Committee—A. H. Bogue, Mrs. J. W. Mills, Mrs. E. C. Wemple, Mr. R. C. Case, Mrs. R. R. Johnson.

Music Committee—Louis Weir, Elsie Mills, Veva Deal, Ethel Eaton, Bertha Garmire, Merto Schermerhorn.

Exhibiting Committee—Mrs. C. S. Royer, Mr. Herman Sicrest, Mr. William Clark, Mr. G. A. Gage, Mr. Rollin Vankirk, Mrs. Marion Garmire, Mrs. J. C. Grossman, Mrs. W. F. Clugston.

Membership Committee for the State Society—Mr. J. C. Grossman, J. W. Lowe, J. W. Mills, M. E. Horner, D. B. Schaeffer.

Membership Committee for Local Society—Myrta Vankirk, Mrs. R. C. Case, R. L. Thompson, L. E. Ferguson, C. C. Smith.

Reception Committee—Mrs. Ocie Eshelman, Mrs. A. M. Patten, Mrs. R. C. Case, Mrs. E. E. Royer, Mrs. Hopey Mills, Mrs. Charles Troxel, H. G. Schermerhorn, E. B. Sherman and Mrs. E. B. Sherman.

Library and Literature Committee—Charles Libey, Etta Somes, Mrs. G. A. Gage, Charles Rowe, Mrs. O. A. Lampman, E. E. Royer.

MRS. A. H. BOGUE,
Secretary.

December 30, 1907.

REPORT OF THE WAYNE COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY.

BY WALTER RATLIFF, SECRETARY.

Farmers of Wayne County are taking a greater interest in entomology and ornithology than ever before, because they realize they must closely study the relationship of the birds and insects with growing crops, if the greatest success is acquired. This is one of the many points that will be presented to the Indiana Horticultural Society at its meeting, Dec. 4-5, by Walter S. Ratliff, secretary of the local horticultural society. Mr. Ratliff will probably be the only Wayne County representative. His report from the local association to that of the state is very interesting, and follows:

"To the Indiana Horticultural Society:

Herewith, I submit this my annual report to your Society of the Wayne County Agricultural and Horticultural Society, together with the roster of its officers for the year 1907. Aside from the meetings in the Society's room in the county court house, during the winter months, the sessions were held at the residence of some of its members, where well-filled bas-

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kets were taken and the day was spent inspecting the orchards, plantations and home surroundings of the host.

In February, as usual, the annual dinner was partaken of by at least one hundred and fifty members and their friends. At this dinner, the women folks friendly vie with one another in the preparation of such delicacies as they desire to take, and take much pleasure in commenting on the good qualities of these articles as they are placed on the dining room tables.

During the year a number of good addresses were given by speakers previously selected, on topics of interest, such as history, literature, agriculture, horticulture, travels and reminiscences, which are subsequently offered for publication in our county newspapers.

Officers for 1907 are: President Isaac G. Dougan; vice president, Wallace C. Reynolds; recording secretary, Hon. Walter Ratliff; treasurer, T. E. Caleb W. King.

Fruits—Disappointment was general in this locality, owing to the partial failure in the fruit yield, owing doubtless to the late freezes and cold raw winds following. All varieties were apparently in the best condition, which, with an abundance of healthy bloom, gave evidence of a bountiful crop, but the results were anything but satisfactory.

Apples—But very few varieties were well laden with fruit, and they of the summer and early autumn varieties. Winter sorts were practically fruitless, even the Ben Davis not bearing. Even the crab apples, that so often are plenty, yielded lightly. Among those that fruited were the Indiana Favorite, Baldwin, Indian, Wealthy, Yellow Transparent, Snow and Winesap.

Pears—But few Kiefer trees and the Duchess varieties bore any fruit, while Flemish Beauty, Sheldon, Seckel, Lawrence and Bartlett pears were seen in most every orchard. Pear blight was comparatively unknown in this locality this year, and the trees made an excellent growth.

Plums—Scarcely an individual tree yielded any plums this year, for all the bloom was most profuse, due, perhaps, as stated above, to climatic conditions in early spring.

Cherries—An almost total failure, even with the sweet cherries that are so often the sorts most desired.

Many new pear orchards are beginning to come into bearing that are being watched with much interest.

Quinces—Singularly enough, most quince bushes, when protected, yielded satisfactorily, and the demand in this section was met by the abundance of this kind of fruit and that, too, of good quality. A few seasons have passed since the bulk of the quince bushes were killed back, so that they have now recovered their former size and vigor for ample fruiting.

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Peaches—Not only the seedling, but the grafted peach trees bore a light crop of peaches. So many trees dropped their fruit when about half matured, while some others ripened it quite unevenly.

Grapes—Many of the grape growers of this section are abandoning the vineyard, owing to the prevalence of the grape-berry worm. This insect rendered some of the varieties this year practically valueless as the tender-rind varieties seem to suffer most, and naturally enough, are the sorts that are most desired.

Strawberries—Most plantations suffered severely by the late freezes last spring, yet at least one-half a crop was gathered that met a most ready sale. A few new promising varieties are now being grown with success by our fruit growers. One seedling has been exhibited growing and ripening fruit almost continuously for a period of two months, the berries of which are of fair size and good flavor.

Gooseberries and Currants—Not many bushes ripened any fruit this year, which was quite a disappointment, as these fruits are becoming more and more popular and additional settings could be profitably done by our fruit men to meet the constantly growing demand.

Blackberries and Raspberries—Apparently, these fruits had to take the place of others and the demand maintained prices far above the average. This has given a stimulus to setting out additional plantations of berry canes, and demonstrates the need of growing different kinds of fruits for market in the same locality.

Entomology and Ornithology—Interest of late has become more general in the subject of the relationship of birds and insects to fruit growing. This has been demonstrated to the satisfaction of the fruit grower, so that he sees the need of protecting the birds to lessen the chances of insect attacks to his trees, vines, canes and maturing fruits. This method tends not only to the increased yield in bushels of fruit, but to the grade and improved condition of the fruit itself, which, from a commercial view, is of great value, resulting in higher prices and lessening the chances of the drawbacks to the keeping of stored or refrigerated ripened fruit."

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INDEX.

Page

Address by Prof. W. C. Latta 56
Address by President Stone 38
Address, Annual, by President Swaim 114
Agriculture—
  Elementary in the Public Schools 154
  Need of Teachers 155
  Shall We Wait for Teachers? 155
  A Necessity 155
  Text-Books 158
  Time to Begin the Instruction 160
Air Drainage 29
Allen, Prof., Indianapolis, Lecture by 164
"All the World is Queer" 50
Annual Address, President's 114
Annual Demonstration Work by Indiana Apple Consumers' League 171
Annual Members, List of 11
Apple Consumers', Indiana, League 171
Apples—
  Ben Davis Good in Indiana 79
  Ben Davis of Southern Illinois 79
  Bitter Rot Affected, Sold in Market 101
  "Buyer Versus Horse Buyer" 86
  Bring Good Prices 215
  Cancer 132
  Care in Handling 82
  Cost of Cold Storage for 84
  Cost of Help in the Orchard 87
  Froze on Trees October 10, 1906 83
  Good Prices for 85
  The Home Trade for 85
  Indiana Consumers' League 111
  Late Bloomers Preferred 205
  List for Third District 219
  List for Fourth District 223
  List for Twelfth District 233
  List as They Ripen in Central Indiana 83
  Lost by Neglect to Spray 205
  Low Price Offered by Dealers 83
  Missing Link 78
  Pollen—How Conveyed 205
  Pittsburg Market 82
  Apple Stem Fungus 132
  Seedless 87, 88
  Seedlings, in Indiana, 1843 201
  Ben Davis Seedlings 125

Digitized by Google

Page
Seedling from Harrison Co. 124
Rome Beauty Seedlings 125
Spencer Seedling 74, 87
Why Seedlings are Usually Sweet 121
Winesap Seedlings 125
Akin 124
Baldwin 79, 83, 167, 201
Ben Davis 75, 79, 81, 84, 128, 167, 204
"Benet" 125
Blushra Crab 124
Clayton 76, 85
"Corydon" 124
Early Harvest 82
Florence Crab 124
Genet 204
Greening, R. I. 75, 200, 201
Grimes (Golden) 75, 83, 84, 128
Hubbardston 204
Indian 75, 83, 85
Indiana Favorite 83
Ingram 201
Jonathan 128, 167
Kinnard 124
Lawver 83
Maiden Blush 79
McMahan 124
Mann 83
Minister 201
Morgan's White 124
Newtown Pippin 167
Osceola 200
Pewaukee 83
Rall's Janet 200
Red Jacket 200
Rome Beauty 83, 85, 124, 204
Roxbury 201
Salome 83
Snow 85
Spitzenburg 128, 167
Stark 76, 79, 83, 85
Summer Rambo 124
Surprise 89
Tariff 200
Wealthy 82
Winesap 124
Wolf River 82
Yellow Bellflower 128
Yellow Newtown Pippin 128
Yellow Transparent 82

Digitized by Google

Page
"Apple Day" 92
Apple, Rev. J. W., Invocation by 142
Arsenate of Lead as a Spray 206
Arsenate of Soda as a Spray 81
Asiatic Labor, Danger from 63
Auditing Committee, Report of 197
Awards, Commitee on, Report of 89, 197

Backyards in 1843 201
Baltimore and Ohio S. W. Railroad 137
Banog, Ran, Letter from 230
Barnard, Dr. H. E., Paper by 97
Barnard, Dr. H. E., Remarks by 101, 102
Beecher, Henry Ward, Quoted 200
Blatchley, W. S., Paper by 143
Beet Weighing 32 Pounds 200
Bitter Rot in Apples 140
Blight of Potatoes 180
Blythe, W. T., Paper by 27
Blythe, W. T., Remarks by 37, 38
Board of Horticulture, Proceedings of 211
Bogue, Mrs. A. H., Secretary, Report of 235
Bordeaux Mixture, When to Use 80
Bordeaux Mixture, How to Make 76
Bordeaux Mixture and Arsenate of Lead 80
Breeding Places for Orchard Enemies 227
Brightest Boys Needed on the Farm 48
Building Stone in Indiana 180
Bulletins to be Issued by the Society 187
Burton, Joe A., Paper by 204
Burton, Joe A., Report by 125
Burton, Joe A., Appointed Superintendent Experimental Orchard Under Contract 212
Burton, Joe A., Letter from 217
Burton, Joe A., Remarks by 134, 139, 187, 206
By-Laws 8

Cantaloupe—
Blight 190
Culture, Hotbed 188
Growing, Leading Counties 188
Growing Encouraged 45
Insects—Striped Bug 193
Profitable 96
Rust Resistant, Variety 191
Seed Used, Varieties 195
Soils Suited to Culture 195
Tiptop Grown in Marion County 195
When Ripe 196

[16—18078]

Digitized by Google

Page
Care of Western Orchards 168
Care of the Orchard 74, 114
Carver, Rev. James W., Invocation by 113
Carver, Rev. James W., Paper by 72
Carver, Rev. James W., Elected C. H. Fifth District..... 199
Carver, Rev. James W., Remarks by 78, 79, 80, 87, 113
Carver Orchard, Illustrated 72, 80, 81
Cato, F., Fruit Grower..... 218
Cement in Indiana 152
Cherries, Varieties for Third District 219
Cherries, Varieties for Fourth District 223
Cherries, Varieties for Twelfth District 233
Children, How Enlist in Horticulture?..... 71
Children of Town, City and Country..... 48
Cider Making 85
Circulation of Sap and Frost..... 57
Citrous Fruits and Frosts..... 29
Clays and Shales in Indiana..... 150
Cleveland, Mrs., Remarks by..... 140
Cline, Oliver, Letter from..... 230
Coal in Indiana 146
Codling Worms Appear Before the Bloom..... 75
Coffin, John F., C. H., Report by..... 223
Coffin, John F., Re-elected C. H..... 199
Compliment to Carver Orchard..... 78
"Come Up Smiling" 76
Concerning Indianapolis in 1843, Paper by Hon. W. H. Ragan, Special Pomologist, Department of Agriculture, Washington, D. C..... 200
Conditions Under Which Frost Injures Vegetation and Means of Prevention, Paper by W. T. Blythe, U. S. Weather Bureau, Indianapolis, Ind..... 27
Conner, Prof. D. B., Paper by..... 102
Consumers' League, Apple 171
Constitution, The 7
Contests for Farmers' Boys and Girls..... 61
Co-operative Work in Horticulture of Purdue Experiment Station, Paper by Prof. C. G. Woodbury, Lafayette, Ind..... 39
Co-operation of Indiana Horticultural Society and Horticultural Department, Purdue Experiment Station, Urged.....66, 115
Co-operation with Purdue Experiment Station Recommended..... 90
Corn School, The 44
Cory, Mr., Remarks by..... 140
Cost of Raising Potatoes..... 184
Cox, Mr., Remarks by.....193, 194
Cox, Sampson, Fruit Grower..... 218
Crown Gall 134
Culture of Hotbed Cantaloupes, Lecture by Prof. C. G. Woodbury, Lafayette, Ind..... 188

Digitized by Google

Page
Culture of Lagrange County, Paper by Mrs. L. E. Furguson, Lagrange County, Indiana 150
Culture, Meaning of 150
Cushions, Use of in Barreling Apples 82
Custer, L. B., Elected Vice-President 199
Custer, L. B., Appointed Member Legislative Committee 208
Custer, L. B., C. H., Report by 227

Dakotas—North and South 30
Deal, Mrs. L. E., Paper by 48
Death of John C. Teas 72
Decker, Cantaloupes at 189
Demonstration Work at the Experiment Station 72
Demonstration Work, Need of, and Benefits to be Derived from, in Orchard and Field 43, 45
Demonstration Work, Most Valuable Means of Education 40
Demonstration Work by the Society Recommended 115
Development of the Home Orchard 44
Devore, E. A., Remarks by 140, 217
Diamonds in Indiana 154
Diseases, Plant—
Apple Cancer 132
Apple Stem Fungus 132
Cantaloupe Blight 190
Crown Gall 132, 134
Fungus 129
Potatoes, Early and Late Blight 180, 181
Melon Rust 194
Wilt of Cucumbers and Melons 192, 193
Doan, John L., Remarks by 70, 185
Domestic Science in the Public Schools, Lecture by Mrs. Helen Romine, Martinsville, Ind. 162
Domestic Science not the Cooking School 163
Domestic Science—Teach It in the Public Schools and It Will Cause the Girls to Respect House Work and Give It Dignity 163
Douglass, B. W., State Entomologist, Lecture by 129
Douglass, B. W., Remarks by 133, 135, 136
Dye, Jesse, Orchard 225

Easy Times in Lagrange County 54
Election of Officers for 1908 198
Encouraging Outlook for More and Better Fruit in Indiana 115
Executive Committee 5
Experiment, Orchard—
Board of Control 212
Letter from Col. Bracket 125
Report of Superintendent 124
Purdue to Keep Records 211

Digitized by Google

Page
Seedling Apples Marked 126
Scions from Nursery Row or Scions from Bearing Trees, Which Preferred? 126
Spraying for Thirty Years—What Effect on Soil? 126
Experiment, Purdue, Station Work—Three Phases 40
Experiment, Purdue, Station Work in Field in Co-operation 41

Farmer, The Best Fed 48
Farmer, The Most Independent 165
Farmers' Short Course at Purdue 44
Fertilizers for Potatoes 184
Fertilizers, Effect on Quality of Potatoes 102
Fisher, Prof. M. L., Purdue, Lecture by 154
Flick, W. B., Remarks by..36, 50, 70, 71, 80, 81, 92, 123, 187, 199, 206, 208
Flick, W. B., Secretary, Report of 116
Flora, Mr., Remarks by 187
Flowers and the Farm Home 49
Floyd County 217
Fools, Some, Own Orchards 74
Forbes, F. A., Elected C. H. Thirteenth District 199
Forbes, F. A., C. H., Report of 233
Forbes, F. A., Remarks by 70
Formulae for Spraying Mixtures 75
Fowler, J. R., Remarks by 92
Fox, Mr., Lecture by 166
Frost—
And Air Drainage 29
Conditions Under Which It Injures Vegetation, and Means of Prevention 27
Canvas Used for Screens Should Not Touch Plants 37
Dry Material and Frost 37
Glass Most Perfect Screen 30
Materials Used for Smudge Fires 32
Means of Preventing 29
Plants Lose Heat by Radiation 28
Sleds for Moving Smudge Fires 33
Smoke and Smudge Fires 30
Successful Prevention—Experience 35
Fruit at Indiana State Fair, 1843 200
Fruit Growing in the West 166
Fruit Growing, Inducements to Engage in 221
Fruit Growing and Mineral Resources of the State 143
Fruit Growers, Names of 208
Fruits, Good Place to Grow Peaches 221
Fruit Special Run Through Central Indiana 141
Fruit and Soil Special 115, 137, 222
Fuels of the State 144
Fumigation of Nursery Stock 134, 135
Furgerson, Mrs. L. E., Paper by 50

Digitized by Google

Page
Garden, a Good, Half the Living..... 48
Gardens in Indianapolis, 1843..... 201
Garden, Indiana, Tavern, in 1843..... 202
Garrison, Amos, Remarks by.....183, 184, 193, 194
Gideon of Minnesota 128
Girls and Housework 162
Gold and Diamonds in Indiana..... 154
Grable, J. W., Letter from..... 218
Grapes in Southern Indiana..... 100
Grapes in Northern Indiana..... 102
Green, Prof., Ohio Experiment Station, Remarks by.....65, 67
Grossman, J. C., C. H., Report by..... 231
Grossman, J. C., Re-elected C. H..... 199
Grossman, J. C., Remarks by 89
Gustin, E. R., Elected C. H., Eleventh District..... 199
Gustin, E. R., Letter from 229

Hale, Henry J., Remarks by.....81, 97, 101, 136
Hazelett, Samuel A., Paper by 82
Hazelett, Samuel A., Treasurer, Report of 120
Hazelett, Samuel A., Re-elected Treasurer 199
Hazelett, Samuel A., Remarks by 70, 78, 87, 124
Hazelett, Mrs. S. A., Remarks by..... 96
Hemmer, Lewis Eli, Fruit Grower..... 218
Henby, J. K., Remarks by.....135, 182, 183, 185, 192, 195
Henry, H. W., Re-elected C. H., Tenth District..... 199
Hobbs, C. M., Remarks by.....78, 87, 92, 97, 123, 135, 139
Honorary Members, Names of..... 10
Horticulture of the Experiment Station Not Limited to Experimental Work 39
Horticulture an Important Phase of Agriculture that Needs More Encouragement by the State..... 38
Housekeeper, A, and Chemistry, Botany and Physics..... 162
How I Market My Apples, Paper by Sam'l A. Hazelett, Greencastle, Indiana 82
How Elementary Agriculture May Be Taught in the Public Schools, Lecture by Prof. M. L. Fisher, Purdue Experiment Station, Lafayette, Indiana 154
How Western Apple Growers Market Their Apples, Lecture by Mr. Fox, Indianapolis, Indiana 167
Hovey's Magazine of Horticulture..... 200
Huston, Prof. H. A., Remarks by.....37, 89, 111, 112, 208

Indiana, The, Apple Consumers' League Eat Two Barrels of Apples.... 171
Indiana Climate Favorable to the Highest Development of Fruits..... 201
Indiana, In, Conditions Favorable for Growing Apples for Market..... 170
Indiana Fair, October, 1843, Fruit Exhibit..... 200
Indiana Good Place to Grow Potatoes..... 182
Indiana Horticultural Society 201

Digitized by Google

Page
Indianapolis Street Trees, 1843 212
Indianapolis Gardens, 1843 201
Indianapolis in 1843 200
Industrial Training in the Public Schools, Lecture by Prof. Allen, M. T. H. S., Indianapolis, Indiana 164
Insect Friends, Our, Lecture by Prof. James Troop, Purdue Experiment Station, Lafayette, Indiana 93
Insects
Brown Tail Moth 93
Cherry Aphis 97
Colorado Potato Beetle 96, 179
Cucumber Flea Beetle 180
Gypsy Moth 93
Lady Bug—Lady Bird 97
Melon Bugs 193
Parasites in the Warfare Against Injurious Insects 93
Plant Lice 96
San Jose Scale—Parasite 135
San Jose Scale 93, 129, 135, 205, 206
Snowy Cricket Injures Apples 136
Study of Pests 130
Tiger Beetle Destroys Potato Bugs 97
Iron Ores in Indiana 154
Invocation by Rev. J. W. Apple 142
Invocation by Rev. Jas. W. Carver 113

Johnson, Sylvester, Remarks by 91, 102, 195, 196, 197

Kingsbury, J. G., Remarks by 182, 183, 184, 187, 195
Knowledge, A, of the Principles Underlying Homemaking Should be Taught Every Girl 163

Lake Michigan Muck 37
Lakes, Thirty-five Beautiful, in Lagrange County 52
Latta, Prof. W. C., Remarks by 64
Lecture—
By Prof. Allen, M. T. H. S 164
By B. W. Douglass, State Entomologist 129
By Prof. M. L. Fisher, Purdue Experiment Station 154
By Mr. Fox, Indianapolis, Indiana 166
By Prof. W. C. Latta 56
By Prof. C. G. Woodbury 188
By Mrs. Helen Romine, Martinsville 162
Legislative Committee, Names of 8
Legislative Committee Commended 115
Lessons of the Past Season, Paper by Joe A. Burton, Mitchell, Indiana. 204
Letter—
From Ran Banog 230
From Col. Bracket, Department of Agriculture, Washington, District of Columbia 125

Digitized by Google

Page
From Joe A. Burton 218
From Oliver Cline 230
From J. W. Grable 218
From E. R. Gustin 229
From D. M. Lichlyter 218
From J. R. Lyons 218
From G. N. Moyer 229
From H. B. Swift 231
Of Transmittal 4
Lichlyter, D. M., Letter from 218
Life Members, List of 10
Lindley, Chas. N., C. H., Report of 216
Lindley, Chas. N., Re-elected C. H 199
List—
Of Apples for Third District 219
Of Apples for Fourth District 223
Of Apples for Twelfth District 233
Of Annual Members 11
Of Honorary Members 10
Of Life Members 10
Of Officers Since Organization 6
List, Cornelius, Remarks by 193, 195
Little, James 88
Lime and Sulphur Wash 76
Local, The, Horticultural Society and What It Should Do, Paper by Mrs. L. E. Deal, White Pigeon, Michigan 48
Lyons, J. R., Letter from 218

McAdie, Prof. Alexander, Quoted 34
Manual Training in the Public Schools Gives Respect for Labor and Dignifies Work 166
Material to be Used in Teaching Agriculture in the Public Schools 157
Melons, Diseases of 190
Melon Diseases, Experimental Work in 42
Melon Growing Profitable 196
Melon Growing and Purdue 42
Melon Growing, Profits of 196
Melon Growing, Leading Counties 188
Melon Rust 191
Melons, Spraying for Rust 191
Melons, Varieties Kolb Gem 195, 196
Melon Wilt 192, 193
Members—
Annual 11
Board of Horticulture 5
Committee on Horticulture 5
Honorary 10
Life 10
Executive Committee 5

Digitized by Google

Page
Legislative Committee 9
Board of Control of Experimental Orchard 5
Memorial, In, John C. Teas 172
Methods of Western Fruit Growers 166
Mineral, The, Resources of Indiana, Paper by W. S. Blatchley, State Geologist, Indianapolis 143
Mineral, The, Resources a Help to Horticulture 143
Milhous, J. J., C. H., Report of 224
Milhous, J. J., Re-elected C. H. 199
Milhous, J. J., Remarks by .....
35, 36, 47, 64, 71, 97, 141, 186, 187, 189, 190, 191, 195, 197
Mississippi Valley Apple Growers' Association 92
Modern Methods in Growing Seed Potatoes, Paper by J. D. Nysewander, Bridgeport, Indiana 174
Moyer, G. N., Letter from 229
Muck for Smudge Fires 37
Muck, Lake Michigan 37
Mystery, The, of a Growing Tree 73

Natural Gas in Indiana 149
Need of Trained Teachers to Teach Elementary Agriculture—Shall We Want for them? 155
Nicholson, B. F., Fruit Grower 218
Northern Indiana's Inducements for Fruit Growers 234
Nurseries in Indiana in 1843 200
Nursery Stock, Prices in 1843 200
Nursery Stock, Dipping Trees 135
Nursery Stock, Fumigation 134
Nysewander, J. D., Paper by 174
Nysewander, J. D., Remarks by 182, 183, 184, 185, 195

Officers Since Organization 6
Officers for 1908 5
Official Score Card 207
Officers, Election of 199
Onion Growing Profitable 234
Onions—Illustrations 232
"Orchard Blessings" 73
Orchard Enemies—Breeding Place 227
Orchard, The Average Indiana Apple, Denounced 170
Orchard—
The Burton 124
The Carver 72
The Carver—Illustrations 72, 80, 81
Profits of the Carver 77
Jesse Dye 225
Experiment 125
Experiment, Purdue to Keep Records of 212

Digitized by Google

Page
Flick 225
The Hazelett 85
The Hazelet, Close Connection with Tinplate Mill, Interurban Line and DePauw 85
The Hazelett, Income Per Acre 85
Inspection of Private 130
Reyman, The 217
Sad Condition of Average Indiana 76
The Stevens 217
Ores, Iron, in Indiana 154

Paper—
By Dr. H. E. Barnard, State Food Commissioner 97
By W. S. Blatchley, Chief State Bureau of Geology 143
By W. T. Blythe, U. S. Weather Bureau 27
By Joe A. Burton, Superintendent Experiment Orchard 204
By Prof. D. B. Conner, Purdue Experiment Station 102
By Mrs. L. E. Deal 48
By Mrs. L. F. Furgeson 50
By J. D. Nysewander 174
By Prof. James Troop, Purdue Experiment Station 93
By Prof. C. G. Woodbury, Purdue Experiment Station 39
Parasite of the San Jose Scale 135
Patton, Mr., of Iowa 128
"Pays His Beer Bills First" 86
Peaches—
Profitable on Ohio River Hills 220
For Third District 219
For Fourth District 223
For Twelfth District 233
Good Place to Grow 220
Pear, The Duchess de Angouleme 201
Pear, The Beurre de Aremberg 201
Pear, St. Michael 202
Pears—
Good Prices for 201
For the Third District 219
For the Fourth District 223
For the Twelfth District 233
Petroleum in Indiana 148
Philosophy of Air Drainage 29
Plans to Get the Boys and Girls Interested in Contests 60
Plants Lose Heat by Radiation 28
Plums—
Profitable 228
For Third District 219
For Fourth District 223
For Twelfth District 233
President's Annual Address 114

Digitized by Google

Page
President's Annual Address, Report of Committee on..... 198
President Swaim Declines Re-election..... 198
Present and Past Instruction in the Public Schools Leads to the Abstract and Away from the Concrete..... 165
Private Orchards, Inspection by State Entomologist..... 130
Proceedings—
Of the State Board of Horticulture..... 211
Presented to the Governor..... 4
Reception of by Governor..... 3
Received and Examined by Auditor of State..... 3
Received by State Printer..... 3
Profits—
In Horticultural Pursuits Should be Collected, Printed and Published to Advertise the State..... 41
In Melon Growing.....194, 196
In Onion Growing..... 234
Purdue Experiment Station—
To Assist Fruit Growers, Truckers, Gardeners by Personal Visitation and Inspection..... 40
Has Sixty-five Private Orchards Under Observation..... 42
Plans of the Horticultural Department Explained..... 39
A Closer Acquaintance and Co-operation with, Urged.....40, 43
Putnam County! Hurrah for..... 78
Potatoes—
Analyses of, Table No. 6..... 108
Analyses of, Figured to Dry Basis, Table No. 7..... 107
Composition and Quality of Irish as Affected by Different Soils and Fertilizers, Paper by Prof. D. B. Conner, Purdue Experiment Station..... 102
Diseases—Blight—Early and Late..... 180
Cost of Manure and Fertilizer..... 184
Cost to Raise..... 184
Deteriorate..... 175
Drainage, Soils, Preparation, Tillage..... 177
Experiment with Straw Mulch..... 185
Fertilizer, Elements in, Grown in Different Soils, Table No. 3..... 106
Food Analyses of, Grown in Different Soils, Table No. 2..... 105
Future Outlook for..... 182
How Cut for Seed.....176, 183
Indiana as a Place to Grow..... 182
Indiana—Michigan..... 184
Moisture and Content of, from Different States, Table 1..... 103
Modern Methods in Growing Seed..... 174
Progress in Seed Improvement..... 175
Seed, Improvement of, Neglected..... 175
Selection for Seed Improvement..... 181
Size of Seed..... 182
Soils—Nitrogen, Phosphorus and Potash Content, Table No. 4..... 106
Status of the Industry in U. S..... 182
Time to Plant..... 185

Digitized by Google

Page
Treatment to Prevent Scab 175
What is Fibre of? 183
Varieties Recommended 185, 186
Early Ohio 185, 186
Empire State 186
Rural New Yorker 185, 186
Yield Per Acre on Fertilized Plats, Table No. 5 107

Ragan, Hon. W. H., Paper by 200
Ragan, Hon. W. H., Chairman of Committee to Report Memorial in Memory of Jno. C. Teas, Reports 172
Ragan, Hon. W. H., Remarks 68, 72, 77, 87, 88, 127
Ratliff, W. S., Secretary Wayne County A. and H. Society, Report by.. 236
Ratliff, W. S., Remarks by 81, 132, 133, 206
Reed, W. C., Elected President 198
Reed, W. C., Remarks by 133, 135, 196, 209
Relation of Humidity and Dew Point Explained 27
Relation, The, of the Farmers' Institutes to the Horticultural Interests of the State, Address by Prof. W. C. Latta, Superintendent Farmers' Institutes, Lafayete, Indiana 56
Reminiscences—W. H. Ragan 68
Romine, Mrs. Helen, Lecture by 162
Report of Auditing Committee 197
Report of Committee—
In Memory of John C. Teas 172
On Awards 89, 197
On Horticulture, First District 214
On Horticulture, Second District 215
On Horticulture, Third District 216
On Horticulture, Fourth District 220
On Horticulture, Sixth District 223
On Horticulture, Seventh District 224
On Horticulture, Eighth District 225
On Horticulture, Ninth District 227
On Horticulture, Eleventh District 229
On Horticulture, Twelfth District 231
On Horticulture, Thirteenth District 233
On Nomenclature 198
On President's Address 198
On Resolutions 90, 207
Report of Lagrange County A. and H. Society 235
Report of Secretary 116
Report of Superintendent of Experiment Orchard 125
Report of Treasurer 120
Report of Wayne County A. and H. Society 236
Resolutions, Committee, Report of 90, 207
Resolution Authorizing a Fruit Exhibit by the Society at the Farmers' Short Course 208
Resolution Favoring a Uniform Package Law for Indiana 207
Resolution Recommending an Official Score Card 207

Digitized by Google

Page
Ritterskamp, W. J., C. H., Report of 214
Ritterskamp, W. J., Re-elected C. H. 199
Ritterskamp, W. J., Remarks by 37, 45
Rockefeller, John D. 88
School of "Hard Knocks" 48
Scions from Nursery Rows and Bearing Trees—Experiments.....126, 128
Score Card for Fruit Exhibits Recommended 207
Secretary's Report 116
Seed for Cantaloupes 195
Seed Improvement in the Potato 181
Shoemaker, A. W., C. H., Report of 225
Shoemaker, A. W., Re-elected C. H. 199
Simpson, R. A., C. H., Report of 215
Simpson, R. A., Re-elected C. H. 199
Snodgrass, J. M., C. H., Report of 227
Snodgrass, J. M., Re-elected C. H. 199
Snodgrass, J. M., Remarks by 37, 38, 46, 102, 111, 135, 140, 141, 186
Social Side of Farmer's Family Benefited by the Local Society 49
Society, The Marion County A. and H., the Noble County and the Lagrange Local, of Great Benefit to the Farmers of These Counties 50
Soil, Is It Affected by Years of Spraying? 126
Some Things the State Entomologist Will Endeavor to do for the Horticultural Interests of the State, Lecture by B. W. Douglass, State Entomologist 129
Spraying—
Arsenate of Lead 206
Arsenate of Lead, When to Use 80
Experiment to Ascertain the Effect on the Soils After Thirty Years' Spraying 126
How to Make Mixtures—Caution 76
In July and August 79, 80
Importance to Include All the Trees 205
Importance of Reaching Every Point of Surface 75
Keeping the Mixtures Stirred 75
For Melon Rust 194
For Melon Wilt 192, 193
More Fluid Needed for Some Varieties 76
Objections to the Use of Bordeaux and Lead Combined 80, 81
Power Sprayers 77
Profit in—Loss by Neglect 76
Quantity it Requires for a Tree 75
Scheme of Annual, Recommended by Flick 206
Time to Spray 74
When it Rains and is Soft in the Orchard 76
When to Use Bordeaux Mixture 80
Standard Sizes of Berry Boxes in Indiana 111
State Board of Horticulture, Proceedings 211
Stevens, The, Orchard 217
Stone, Dr., Purdue University, Lafayette, Address by 38

Digitized by Google

Page
Stones, Building, in Indiana 149
Strawberries—
Profitable in Indiana 228
Should be on Every Farmer's Table 49
For the Third District 219
For the Fourth District 223
For the Twelfth District 233
Strawberry Jam Made from Glucose, Aniline Dyes and Clover Seed 98
Straw, Poor Economy for Farmers to Sell 187
Swaim, President, Declines Re-election 198
Swaim, President H. H., Annual Address by 114
Swaim, President H. H., Remarks by .....
37, 46, 50, 55, 56, 64, 65, 71, 96, 102, 111, 112
123, 136, 141, 161, 184, 186, 187, 188, 209
Swift, H. B., Letter from 231
San Jose Scale Should be Named Chinese Scale 76
San Jose Scale 115, 133, 171, 205, 206

Tavern Back Yard as Beecher Saw It 201
Teas, John C., Committee Appointed to Submit Report in Memory of .. 72
Teas, John C., in Memorial, Report of Committee 172
Teas, E. Y., Re-elected Member Executive Committee 199
Text-books on Elementary Agriculture in Public Schools 158
Thoughts Concerning the Fruit and Soil Special, Lecture by Prof. C. G. Woodbury, Purdue Experiment Station 137
Traub, Mr., Remarks by 133, 184
Treasurer's Report 120
Trees—
Civilization Butchers Trees 203
Changed to Agate 73
The Elm Most Magnificent 204
How Trim—Hints 77
Troop, Prof. James, Paper by 93
Troop, Prof. James, Remarks by .....
45, 55, 80, 81, 86, 92, 96, 97, 127, 136, 139
141, 142, 183, 184, 185, 186, 187, 193, 208
Trucking in Indiana Profitable 221
Trucking in Marion County 224
Tufts,* Elmer G., C. H., Report of 220
Tufts, Elmer G., Re-elected C. H 199

Uncivilized Orchards 75
Use of Cushions for Packages 82

Value of the Apple for Food 49
Value of Honest Packing 170
Value, The, of Pure Food Laws to Horticulturists, Paper by Dr. H. E. Barnard, State Food and Drug Commissioner, Indianapolis, Indiana 97

*Deceased.

Digitized by Google

Varieties of— Page
Apples for Third District 219
Apples for Fourth District 223
Apples for Twelfth District 233
Cherries for Third District 219
Cherries for Fourth District 223
Cherries for Twelfth District 233
Peaches for Third District 219
Peaches for Fourth District 223
Peaches for Twelfth District 233
Pears for Third District 219
Pears for Fourth District 223
Pears for Twelfth District 233
Plums for Third District 219
Plums for Fourth District 223
Plums for Twelfth District 233
Potatoes Recommended 185, 186
Strawberries for Third District 219
Strawberries for Fourth District 223
Strawberries for Twelfth District 233
Watermelons for Market 196
Cantaloupes for Market 195
Vinegar, Fraudulent, Sold in Indiana..... 99
Vitality of Trees Necessary..... 75

Walker, E. J., Remarks by..... 96
Washington County 218
Weather Forecasts Explained 35
Weather Forecasts, Spreading 34
Western Methods in Fruit Growing, Lecture by Mr. Fox, Indianapolis, Indiana 166
Western Orchardist and His Family Must Live a Pioneer Life..... 169
Western Orcharding no Place for Old Men..... 169
Western Orchardist, to Succeed Must Have Capital..... 169
What is Thorough Spraying and How to do It, Paper by Rev. James W. Carver, Greencastle, Indiana..... 72
What Spraying for? 75
Wilson, Theodore, Remarks by..... 186
Wine Growers of France..... 98
Woodbury, Prof. C. G., Paper by 39
Woodbury, Prof. C. G., Lecture by 188
Woodbury, Prof. C. G., Remarks by.....
91, 97, 139, 140, 142, 190, 192, 193, 194, 195, 196, 206, 208
Words of Welcome, Address by Dr. Stone, President Purdue University, Lafayette, Indiana..... 38
Work on the Farm Will Not Make an Agriculturist..... 165
Work in the Factory Narrows..... 165

Yellow Bellflower Apple 128
Yellow Newtown Pippin 128
Yellow Transparent Apple 82

Zion, J. M., Remarks by.....46, 47, 62, 67, 79, 86, 87, 88, 91, 101, 171

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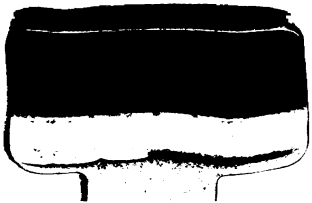

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